ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – PRELIMINARY DRAFT

Permit Number: AK0021431

Valdez Wastewater Treatment Facility

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

Public Comment Period Start Date: DRAFT

Public Comment Period Expiration Date: DRAFT

Alaska Online Public Notice System

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Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to

CITY OF VALDEZ

For wastewater discharges from

Valdez Wastewater Treatment Facility
800 S. Sawmill Road
Valdez, AK, 99686

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to reissue an APDES individual permit (permit) to the City of Valdez. The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Valdez Wastewater Treatment Facility (WWTF) and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limits and other conditions
- technical material supporting the conditions in the permit
- proposed monitoring requirements in the permit

Public Comment

Persons wishing to comment on or request a public hearing for the draft permit for this facility, may do so in writing by the expiration date of the public comment period.

Commenters are requested to submit a concise statement on the permit condition(s) and the relevant facts upon which the comments are based. Commenters are encouraged to cite specific permit requirements or conditions in their submittals.

A request for a public hearing must state the nature of the issues to be raised, as well as the requester's name, address, and telephone number. The Department will hold a public hearing whenever the Department finds, based on requests, a significant degree of public interest in a draft permit. The Department may also hold a public hearing if a hearing might clarify one or more issues involved in a permit decision or for other good reason, in the Department's discretion. A public hearing will be held at the closest practicable location to the site of the operation. If the Department holds a public hearing, the Director will appoint a designee to preside at the hearing. The public may also submit written testimony in lieu of or in addition to providing oral testimony at the hearing. A hearing will be tape recorded. If there is sufficient public interest in a hearing, the comment period will be extended to allow time to public notice the hearing. Details about the time and location of the hearing will be provided in a separate notice.

All comments and requests for public hearings must be in writing and should be submitted to the Department at the technical contact address, fax, or email identified above (see also the public comments section of the attached public notice). Mailed comments and requests must be postmarked on or before the expiration date of the public comment period.

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a Response to Comments document that will be made available to the public. If no substantive comments are received, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may waive this review period. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 Alaska Administrative Code (AAC) 15.185.

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

Appeals Process

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 20 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage AK, 99501

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://dec.alaska.gov/commish/review-guidance/informal-reviews for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
Mail : P.O. Box 11180
Juneau, AK 99811
In Person: 555 Cordova Street
Anchorage, AK 99501

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://dec.alaska.gov/commish/review-guidance/adjudicatory-hearing-guidance for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: http://dec.alaska.gov/water/wastewater/.

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street Anchorage, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program **Mail**: P.O. Box 111800 **In Person**: 410 Willoughby Avenue, Suite 303 Juneau, AK 99811-1800 (907) 465-5180

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1.0 INTRODUCTION

1.1 Applicant

This fact sheet provides information on the Alaska Pollutant Discharge Elimination System (APDES) permit for the following entity:

Permittee:	City of Valdez
Facility:	Valdez Wastewater Treatment Facility
APDES Permit Number:	AK0021431
Facility Location:	800 S. Sawmill Road, Valdez, AK 99686
Mailing Address:	PO Box 307, Valdez, AK 99686
Facility Contact:	Mr. Brad Koch

The map in Section 2.1 Figure 1 shows the location of the treatment facility. The process flow diagrams in Section 2.2 Figures 2 and 3 outline the treatment process and location of the outfall.

1.2 Authority

Section 301(a) of the Clean Water Act (CWA) and Alaska Administrative Code (AAC) 18 AAC 83.015 provide that the discharge of pollutants to water of the U.S. is unlawful except in accordance with an APDES permit. The individual permit reissuance is being developed per 18 AAC 83. A violation of a condition contained in the Permit constitutes a violation of the CWA and subjects the permittee of the facility with the permitted discharge to the penalties specified in Alaska Statutes (AS) 46.03.760 and AS 46.03.761.

1.3 Permit History

The National Pollutant Discharge Elimination System (NPDES) permit for the facility was initially issued by the Environmental Protection Agency (EPA) in December 1978. EPA reissued the permit again in 1985, 1990, and 2002. Authority of the permit transferred to DEC in October 2008, upon the EPA's approval of DEC's application to administer the NPDES Program under the APDES Program. The NPDES permit was under administrative extension for eight years, from 2007 until 2015. The first APDES permit, AK0023431, became effective on August 1, 2015 and was administratively extended on July 14, 2020.

2.0 BACKGROUND

2.1 Facility Information

The City of Valdez (City) owns, operates and maintains the Valdez Wastewater Treatment Facility (WWTF, or the facility), a publicly owned treatment works (POTW) located approximately four miles east of the city of Valdez, south central Alaska (see Figure 1). The WWTF was designed and constructed in 1978 to treat domestic wastewater as a zero-discharge facility with two aerated lagoons and a percolation pond. Due to the high groundwater table the WWTF never functioned as a zero-discharge facility; the percolation pond now serves as a chlorine contact pond.

The Valdez WWTF collects and treats domestic and commercial wastewater from the resident population and commercial businesses across a 22-mile sewer network, serving approximately 3,800 people. The facility does not receive significant contributions from industrial users, however, there are plans to accept treated bilge water from the Valdez New Harbor Bilge Water Treatment Facility (NHBWTF). Loading is seasonal and corresponds to the fishing and summer tourist season. The collection system is separated from the storm sewer system. There have not been any major modifications since the previous APDES permit issuance.

Wastewater is treated to secondary treatment standards and disinfection through chlorination. In the treatment process, a force main conducts influent into the facility where the flow is directed to two 3000-gallon aeration

ponds. Following aeration, the mixed liquor solution is disinfected by chlorination and the effluent flows by gravity into Port Valdez.

Treated wastewater is discharged to Port Valdez via Outfall 002A, a 244-foot-long, two-foot diameter outfall pipeline. The pipeline terminates in a 60-foot-long submerged multiport diffuser anchored to the bottom of Port Valdez, 23 feet (ft) below mean lower low water (MLLW) and orientated parallel to the direction of tidal flow. The diffuser is twelve inches in diameter and contains six eight-inch diameter ports.

Table 1 summarizes average facility performance based on daily maximum values reported through netDMR from August 2015 through July 2020.

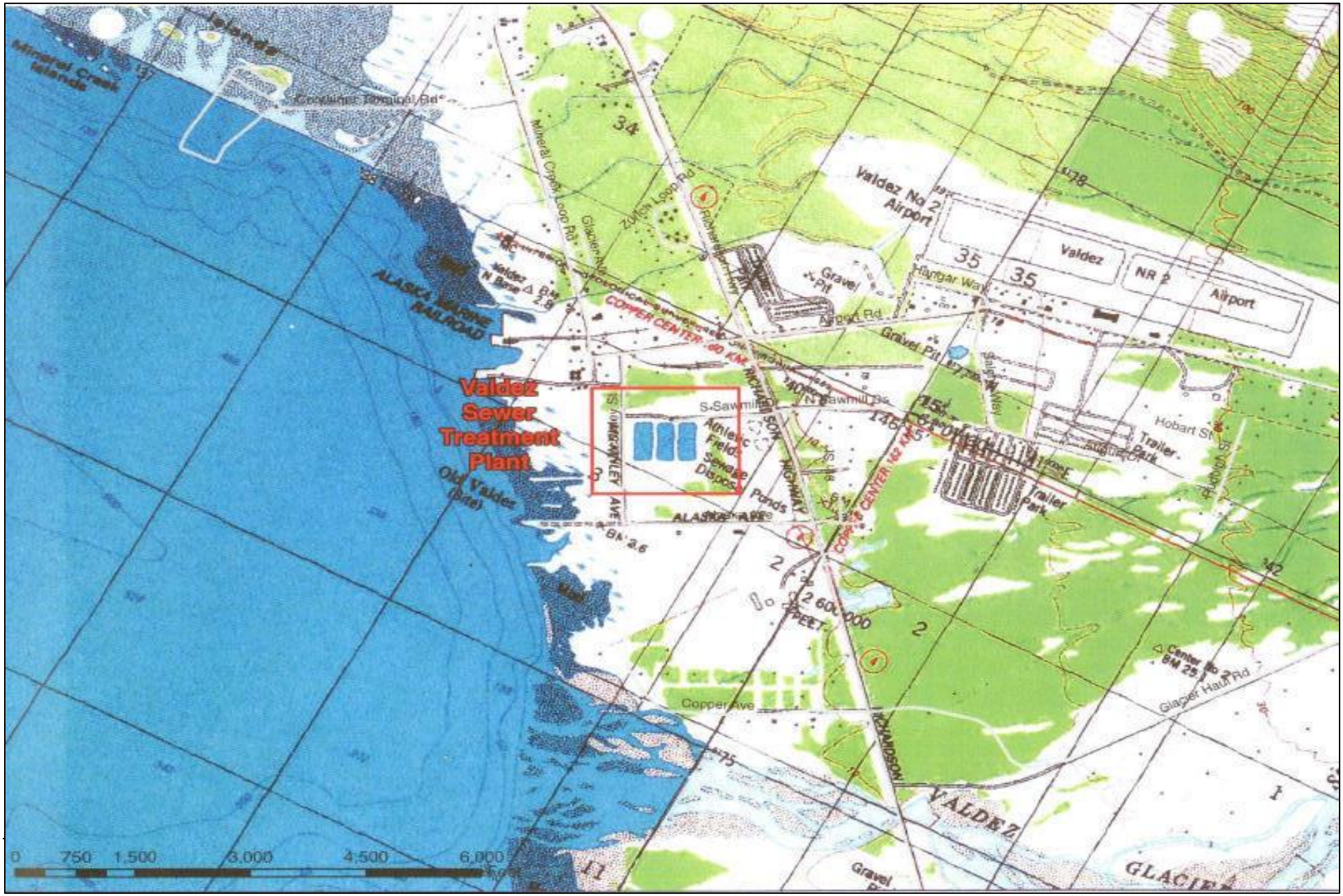
Table 1: Average Facility Plant Performance

Parameter	Average Value 2015-2020 [a]
Flow	1.35 mgd
5-Day Biochemical Oxygen Demand (BOD_5) concentration	42.1 mg/L
BOD_5 Loading/Mass	45 lbs/day
BOD_5 percent removal	91.2%
Total Suspended Solids (TSS) concentration	29.1 mg/L
TSS loading/mass	32 lbs/day
TSS percent removal	94.5%
pH	7.53 S.U.
Temperature	10.5 ^{o}C
Dissolved Oxygen (DO)	9.7 mg/L
Chlorine, Total Residual concentration (TRC)	0.02 mg/L
TRC loading/mass	0.18 lbs/day
Fecal coliform (FC) bacteria	105 FC/100mL
Enterococci bacteria	28 cfu/100mL
Total Ammonia, as Nitrogen (ammonia)	7.1 mg/L
Copper, total recoverable (copper)	6.0 µg/L

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, S.U. = standard units, ^{o}C = degrees Celsius, FC/100 mL = Fecal Coliform per 100 milliliters, cfu/100 mL = colony forming units per 100 milliliters, µg/L = micrograms per liter.

Figure 1: Valdez Wastewater Treatment Facility Topographic Map



2.2 Wastewater Treatment

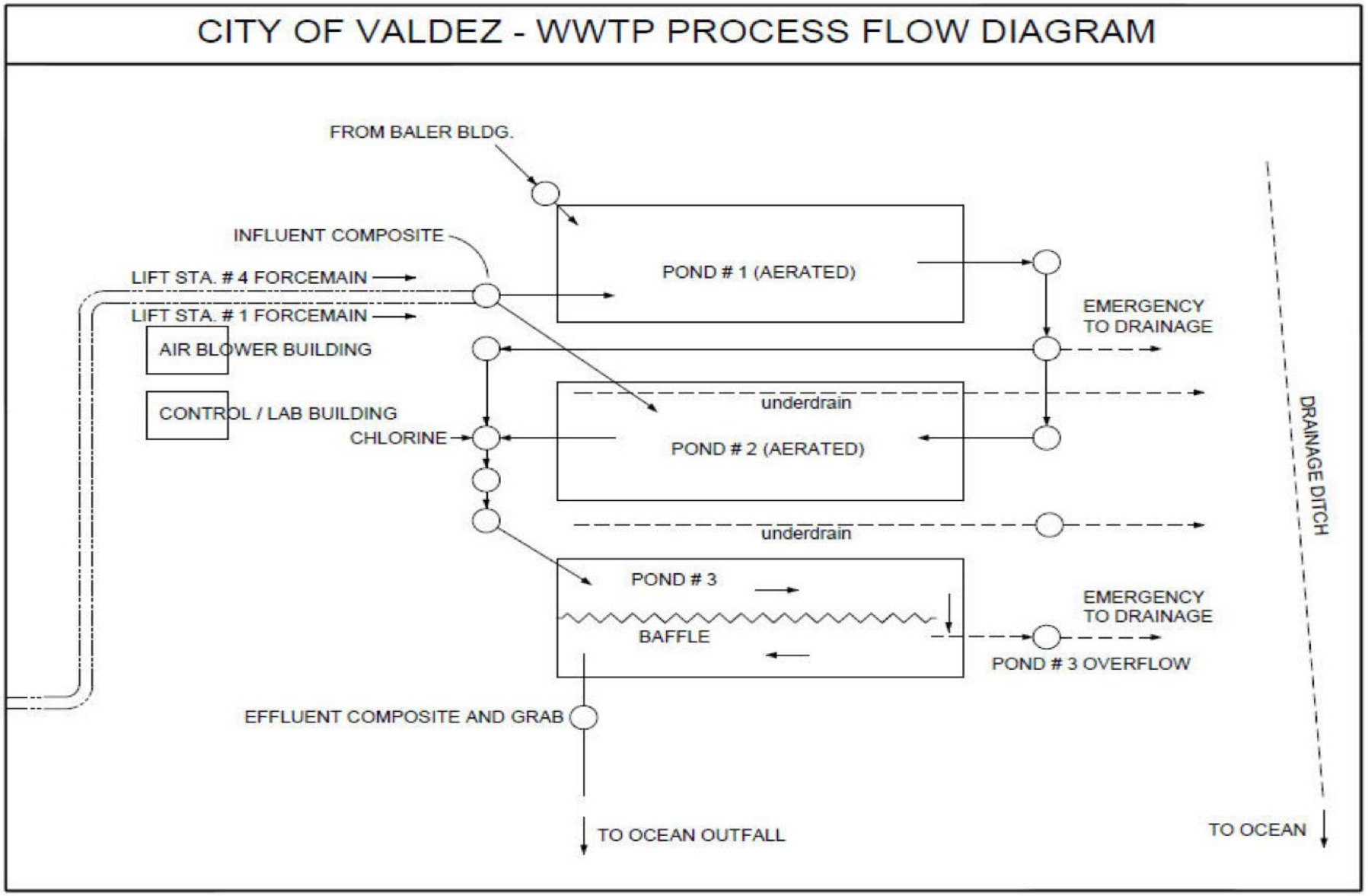
The facility was designed and constructed to provide secondary treatment of domestic wastewater using aerated lagoons and chlorine disinfection prior to final discharge to the marine water of Port Valdez. (see Figure 2 and Figure 3). The average daily flow rate for the facility is 1.5 mgd with a permitted peak daily flow of 2.5 mgd.

The facility does not have headworks on site. Eight pump stations move approximately 930,000 gallons of raw influent through bar screens and comminutors located in the main pump station upstream of the facility. Debris that is removed is manually cleaned from the bar screens and disposed of to landfill. Following the comminutors, the influent enters a five-mile force main to the facility.

Flow is directed to two 3000-gallon aerated ponds. Aeration levels are checked daily, and repairs are undertaken as needed. The fully mixed and aerated solution of mixed liquor is then disinfected by gas chlorination using a Regal chlorinator. Wastewater then flows in to a third chlorine contact pond; a baffle aims to increase detention time and prevent short circuiting. The target detention time is three days. This is the final step of treatment before the effluent flows by gravity through a two-foot outfall pipeline where it is discharged into Port Valdez.

Figure 2: Valdez Wastewater Treatment Facility Site Plan

Figure 3: Valdez Wastewater Treatment Facility Process Flow Diagram



2.3 Pollutants of Concern

Pollutants of concern known to be present in the effluent of the Valdez WWTF consist of domestic wastewater conventional pollutants regulated in the technology-based effluent limits (TBELs) via the secondary treatment standards, including biochemical oxygen demand (BOD_5), total suspended solids (TSS) and pH. Additional domestic wastewater pollutants known to be in the discharge are DO, FC bacteria, enterococci bacteria, ammonia and copper. As the Valdez WWTF has a design flow larger than 1.0 mgd, Whole Effluent Toxicity (WET) is a pollutant of concern as required under 18 AAC 83.335(b)(1). More information about WET can be found in Fact Sheet Part 3.4.

The previous APDES permit identified additional pollutants of concern from priority pollutant scans conducted prior to reissuance and the required additional monitoring for specific parameters. Additional monitoring was required to provide a robust dataset to establish water quality-based effluent limits (WQBELs), if necessary. The parameters monitored in the previous APDES permit cycle were enterococci bacteria and copper. Based on the additional monitoring, enterococci and copper remain pollutants of concern. Monitoring of copper required in the previous APDES permit is continued and extended in the permit with an increased monitoring frequency from quarterly to monthly. More information about copper monitoring requirements can be found in Fact Sheet Part 3.3 and Appendix A.

Average results for detected pollutants for the Valdez WWTF required for monitoring during the previous five-year permit cycle are summarized in Table 1.

2.4 Compliance History

DEC reviewed Discharge Monitoring Reports (DMRs) submitted by the City for monitoring periods from August 2015 to July 2020 to determine the facility's compliance with effluent limits. The DMR review showed no effluent limit exceedances or violations for Outfall 002A.

DEC Compliance Program conducted a facility inspection on April 11, 2016 and May 17, 2018. The inspection reports on both dates indicated that the facility was not operating within the permit requirements. DEC's Compliance and Enforcement issued a Compliance Letter to the permittee on June 7, 2016 and June 12, 2018. The 2016 Compliance Letter addressed non-compliance with documented administrative violations relating to the Quality Assurance Project Plan (QAPP), Operation and Maintenance (O&M) Plan, and deficiencies in the outfall signage. The 2018 Compliance Letter addressed administrative violations relating to failure to produce an O&M Plan, and failure to fulfill the facility planning requirement; this was corrected by the facility on May 29, 2018 and no further action was required.

As required by the Compliance Letters, the permittee provided a response to DEC's Compliance and Enforcement Program on September 27, 2016. The response included submission of an updated QAPP, updated O&M Plan, and photographs of new outfall signage to comply with permit requirements. The response to the 2018 Compliance Letter was received on June 22, 2018 and included an updated O&M Plan.

DEC reviewed the information submitted with the City's application for permit reissuance, first received February 27, 2020 and continuing until October 21, 2020. DEC identified certain deficiencies in the information required for submittal of the application, described below.

Incomplete expanded effluent testing. The City performed expanded effluent testing in 2016, 2017, and 2018; however, the expanded effluent testing did not include all of the required parameters. Organic compounds were only tested in the 2018 testing event, and the organic compounds tested were not a complete list of the parameters required in Supplement A.

Deficiencies with Whole Effluent Testing (WET) requirements. DEC identified two deficiencies with the City's WET testing results. The first was that one of the organisms used for WET testing was not the species required by the permit, per section 1.4.1.2 and section 1.4.1.3 requirements of the previous APDES permit. No screening results were provided for review and no written approval was requested for the use of an alternative species before the WET testing was conducted. Secondly, accelerated WET testing was not performed as required by the permit section 1.4.2.7. The September 2019 WET testing event (embryo survival and development) yielded a Chronic Toxic Unit (TUc) in the (100/No Observed Effects Concentration (NOEC) test result of 21.2. This result should have triggered additional toxicity testing, but no additional toxicity testing was performed.

3.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

3.1 Basis for Permit Effluent Limits

Per 18 AAC 83.015, the Department prohibits the discharge of pollutants to waters of the U.S. unless the permittee has first obtained a permit issued by the APDES Program that meet the purposes of AS 46.03 and is in accordance with the CWA Section 402. Per these statutory and regulatory provisions, the Permit includes effluent limits that require the discharger to (1) meet standards reflecting levels of technological capability, (2) comply with 18 AAC 70 – Water Quality Standards (WQS), and (3) comply with other state requirements that may be more stringent.

The CWA requires that the limits for a pollutant be the more stringent of either TBELs or WQBELs. TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQS are met. WQBELs may be more stringent than TBELs.

The permit contains a combination of both TBELs and WQBELs. The Department first determines if TBELs are required to be incorporated into the permit. TBELs for publicly owned treatment works (POTWs), which apply to the Valdez WWTF, are derived from the secondary treatment standards found in Title 40 Code of Federal Regulations (40 CFR) §133.102 and 40 CFR §133.105, adopted by reference 18 AAC 83.010(e). The following section summarizes the proposed effluent limits. A more expansive technical and legal basis for the proposed effluent limits is provided in Appendix A Basis for Effluent Limitations.

3.2 Basis for Effluent and Receiving Water Monitoring

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and receiving water data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving waterbody quality.

The Department may also require the permittee to perform the additional effluent monitoring required by the APDES application Form 2A for POTWs, so that this data will be available when the permittee applies to reissue the APDES permit. The permittee is responsible for conducting the monitoring and submitting the results with the application for renewal of the APDES permit. The permittee should consult and review Form 2A upon permit issuance to ensure that the required monitoring in the application will be completed prior to submitting a request for permit renewal. A copy of Form 2A can be found at http://dec.alaska.gov/water/wastewater/permit-entry/domestic-and-municipal/.

3.3 Effluent Limits and Monitoring Requirements

The permit contains a combination of both TBELs and WQBELs. The following summarizes the proposed effluent limits. A more expansive technical and legal basis for the proposed effluent limits is provided in Appendix A.

The permit contains new or revised WQBELs for DO, ammonia, and copper. The permit contains new monitoring requirements for enterococci bacteria, total phosphorus (phosphorus), cyanide as free cyanide (cyanide), total recoverable zinc (zinc), total recoverable nickel (nickel), total recoverable manganese (manganese), total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH). The WQBELs for total residual chlorine, and FC bacteria are carried forward from the previous permit. In addition, the permit includes requirements to monitor the effluent for WET annually. Data will be used to conduct future reasonable potential analysis to determine if discharges of these parameters might cause an exceedance of the WQS in the receiving waterbody.

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance, and to evaluate effluent quality and variability. The permittee has the option of taking more frequent samples than required under the permit. These additional samples must be used for averaging (for pollutants results reported on a monthly or weekly average) if they are conducted using the Department approved test methods (found in 18 AAC 70 and 40 CFR §136, adopted by reference in 18 AAC 83.010).

For all effluent monitoring the permittees must use a sufficiently sensitive EPA approved test method that quantifies the pollutants to a level lower than applicable limits or water quality standards or use the most sensitive test method available, per 40 CFR §136, adopted by reference in 18 AAC 83.010(f).

The permit requires influent monitoring prior to treatment and effluent monitoring at Outfall 002A. The permit carries forward the monitoring requirements and effluent limits for BOD_5, TSS, and pH from the previous permit. Effluent limits are based on the secondary treatment standards adopted in 18 AAC 83.010(e). Monitoring requirements and effluent limits carried forward from the previous permit include the permit requirement to monitor the influent for BOD_5 and TSS to calculate monthly removal rates for these parameters. The seasonal minimum percent removal limit of 80% from the winter season (October 1 – May 31) for BOD_5 in the previous permit has been removed. This was a requirement carried over from earlier NPDES permits because the City historically experienced excessive infiltration and inflow (I/I) from stormwater into the city sewer system and lagoons during the winter season. Excessive I/I diluted the influent and reduced BOD_5 percent removal rates. An evaluation of BOD_5 percent removal rates reported in DMRs from August 2015 to July 2020 demonstrated that that seasonal BOD_5 percent removal rates are no longer necessary. Further information outlining the details of the effluent limits and monitoring requirements for Outfall 002A can be found in Table 2 and in Appendix A.

The permit requires the monitoring of DO concentration. The effluent limits are based on the requirements of 18 AAC 70.010(15)(A)(i). The daily minimum limit has been changed from the previous permit, increasing from 2.0 mg/L to 4.0 mg/L. After a review of DO monitoring results from August 2015 – July 2020, DEC determined that the facility has the capability to meet the minimum surface DO condition of 18 AAC 70.020(b)(15)(A)(i). The daily maximum limit of 17 mg/L and monitoring requirement is carried forward from the previous permit. More information about the effluent limits for DO can be found in Appendix A.

The permit requires the monitoring of TRC. Effluent limits are based on standard operating procedures for domestic wastewater facilities that use chlorine to disinfect wastewater, applicable to Valdez WWTF. The monitoring requirement and effluent limits are carried forward from the previous permit. TRC fits within the authorized mixing zone. More information about the effluent limits for TRC can be found in Appendix A.

The permit requires monitoring of FC and enterococci bacteria. The Daily Maximum Limit for FC bacteria of 800 FC/100 mL, the Average Weekly Limit of 400 FC/100 mL and the Average Monthly Limit of 200 FC/100 mL are carried forward from the previous permit, as is the monthly monitoring requirement. The permit includes a requirement for monitoring enterococci bacteria. Enterococci are indicator organisms of harmful pathogens in fresh water and are a better indicator of acute gastrointestinal illness than FC bacteria. The monitoring requirement for enterococci has changed from the previous permit. The previous permit required monitoring for enterococci bacteria two times per year with no seasonal restrictions, but the current permit

requires monthly monitoring for enterococci bacteria during the summer season only. The summer season is defined as the time period of May 1 to September 30. The reason for the change to seasonal monitoring for enterococci is to be consistent with EPA's recommended recreational water quality criteria (RWCQ). The RWCQ adopts enterococci bacteria as the recommended contact recreation WQ criteria for marine waters during the summer season when contact recreation is more likely to occur. Effluent monitoring for enterococci is required to be performed in conjunction with FC bacteria monitoring. The Valdez WWTF has demonstrated that it cannot meet the Alaska WQS for FC at the end of the pipe through its disinfection methods and DEC has determined that the facility's disinfection methods are also insufficient to meet WQS for enterococci bacteria at the end of the pipe. Therefore, the WQS-WQBEL for FC bacteria in the previous permit is also applied in the current permit. FC and enterococci bacteria are included as parameters in the mixing zone.

Monitoring frequency of monthly reporting is required to sufficiently monitor the facility's performance and variability and is carried forward from the previous permit. More information about FC and enterococci bacteria monitoring requirements can be found in Appendix A.

The permit requires continued monitoring for temperature because temperature continues to be a pollutant of concern. Monitoring during the previous permit cycle demonstrated that that the temperature of the effluent exceeds WQS. Temperature fits within the authorized mixing zone. More information about temperature monitoring requirements can be found in Appendix A.

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed the Department projects the receiving waterbody concentration (RWC) for each pollutant of concern outside the mixing zone of where the effluent enters the waterbody. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the RWC. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is RP that the discharge may cause or contribute to an excursion above the applicable WQS, and a WQBEL must be developed. If the projected concentration of the receiving waterbody is lower than the numeric criterion for a limited parameter, then there is not RP that the discharge may cause or contribute to an excursion above the applicable WQS and it is expected that the effluent will meet WQS at the point of discharge. The effluent limits that would be applied are the WQS for the limited parameter.

The permit requires continued monitoring for ammonia. Ammonia was the driver of the acute and chronic mixing zones during the previous permit cycle. Ammonia is the driver of the chronic mixing zone and copper is the driver of the acute mixing zone in the current permit. DMR data collected by the City from August 2015 – July 2020 was evaluated to determine whether there was RP to cause or contribute to an exceedance of the ammonia criteria. A reasonable potential analysis (RPA) of effluent ammonia data reveals that concentration of ammonia present in the effluent of the Valdez WWTF does have RP to exceed the aquatic life marine water standards. DEC derived ammonia criteria from the *Alaska Water Quality Criteria Manual for Toxic and other Deleterious Organic and Inorganic Substances (2008)* (Toxics Manual). Consistent with the *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (RPA Guide), the salinity and the 85th percentile of the pH and temperature of the receiving water data provided by the City was used to calculate the ammonia criteria from tables contained in Appendices F and G of the Toxics Manual. The toxicity of ammonia is dependent on pH, temperature, and salinity; therefore, the criteria are also pH, temperature, and salinity dependent. The 85th percentile receiving water pH was 7.9 S.U., the 85th percentile of receiving water body temperature was 7.7 ^{o}C, and salinity was 11.9 grams per kilogram (g/kg). The acute ammonia numeric WQS criterion was calculated to be 17.3 mg/L and the chronic criterion was determined to be 2.6 mg/L. Consistent with the RPA Guide, the Department determined the daily maximum effluent limit for ammonia to be 41 mg/L and the average monthly effluent limit to be 23 mg/L. The monthly monitoring frequency for ammonia is carried forward from the previous permit. More information about the RPA for ammonia can be found in Part 4.4 and Appendix A.

The permit requires continued monitoring for copper. Copper was identified as a pollutant of concern in the previous permit and an RPA of the effluent copper data obtained during the previous permit cycle demonstrated

that copper has an RP to exceed the aquatic life marine water standards and is the driver for the acute mixing zone. The acute copper numeric WQS criterion was calculated to be 5.8 μg/L and the chronic criterion was determined to be 3.7 μg/L. Consistent with the RPA Guide, the Department determined the maximum daily effluent limit for copper to be 13 μg/L and the average monthly effluent limit for copper to be 9.0 μg/L. The monitoring frequency is increased from quarterly to monthly reporting in order to sufficiently monitor the facility's performance and variability and to produce a more robust dataset to conduct reasonable potential analysis for the next permit reissuance. More information about the RPA for copper can be found in Part 4.4 and Appendix A.

The permit requires monitoring for phosphorous, cyanide zinc manganese nickel, TAH and TaqH. These pollutants have been identified as parameters of concern based on the results of the extended effluent testing undertaken in the previous permit cycle and the NHBWTF spike testing conducted in 2019. Monitoring requirements for these parameters have been introduced in order to sufficiently monitor the facility's performance and variability, and to produce a more robust dataset to conduct reasonable potential analysis for the next permit reissuance.

Table 2: Outfall 002A: Effluent Limits and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units [a]	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	mgd	N/A	Report	N/A	2.5	Effluent	Continuous	Recorded
Biochemical Oxygen Demand (BOD_5)	mg/L	N/A	30	45	60	Influent and Effluent [c]	1/Week	24-hour Composite [d]
	lbs/day [b]		375	563	751			Calculated
Total Suspended Solids (TSS)	mg/L	N/A	30	45	60	Influent and Effluent	1/Week	24-hour Composite
	lbs/day		375	563	751			Calculated
BOD_5 & TSS Minimum Percent (%) Removal	%	N/A	85 [e]	N/A	N/A	Influent and Effluent	1/Month	Calculated
pH	S.U.	6.5	N/A	N/A	8.5	Effluent	2/Week	Grab
Temperature	° C	N/A	N/A	N/A	Report	Effluent	1/Week	Grab
Dissolved Oxygen (DO)	mg/L	4.0	N/A	N/A	17	Effluent	2/Week	Grab
Total Residual Chlorine (TRC) [f]	mg/L	N/A	0.03	N/A	0.07	Effluent	2/Week	Grab
	lbs/day		0.4		0.9			
Fecal coliform Bacteria (FC)	FC/ 100 mL	N/A	200 [g]	400 [g]	800	Effluent	2/Week	Grab
Enterococci Bacteria	cfu/ 100 mL	N/A	N/A	N/A	Report	Effluent	1/Month [h]	Grab
Total Ammonia, as N	mg/L	N/A	23	N/A	41	Effluent	1/Month	24-hour Composite
	lbs/day		287		513			
Copper, total recoverable	µg /L	N/A	9.0	N/A	13	Effluent	1/Month	24-hour Composite
	lbs/day		0.11		0.16			
Cyanide, free available [i]	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter [j]	24-hour Composite
Zinc, total recoverable	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	24-hour Composite
Nickel, total recoverable	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	24-hour Composite
Manganese, total recoverable	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	24-hour Composite
Total Phosphorus	mg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	24-hour Composite
Total Aromatic Hydrocarbons (TAH) [k]	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	Grab
Total Aqueous Hydrocarbons (TAqH) [k]	µg/L	N/A	N/A	N/A	Report	Effluent	1/Quarter	Grab

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, S.U. = standard units, ° C = degrees Celsius, FC/100 mL = Fecal Coliform per 100 milliliters, cfu/100 mL = colony forming units per 100 milliliters, µg/L = micrograms per liter.

b. Loading in lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor). All loading limits calculated using an average daily flow of 1.5 mgd.

c. Limits apply to effluent. Report average monthly influent concentration. Influent and effluent composite samples shall be collected during the same 24-hour period.

d. See Appendix C for definition.

e. Minimum % Removal = [(monthly average influent concentration in mg/L – monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.

f. The TRC effluent limits are not quantifiable using EPA-approved analytical methods. DEC will use the minimum level (ML) of 0.1 mg/L as the compliance evaluation level for this parameter.

g. If more than one bacteria sample is collected within the reporting period, the average result must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the product of the quantities. For example, the geometric mean of 100, 200, and 300 is $(100 \text{ X } 200 \text{ X } 300)^{1/3} = 181.7$.

h. One sample shall be collected each month, May through September, on the same day as a fecal coliform bacteria sample is collected.

i. The aquatic life criteria for free cyanide shall be measured as weak acid dissociable (WAD) cyanide or equivalent approved EPA methods.

j. Once per quarter means once every three months based on the calendar year beginning with January: Jan–March, April–June, July–Sept, and Oct–Dec.

k. Samples must be collected when the bilge water offload to the facility is in operation.

3.4 Whole Effluent Toxicity Monitoring

Alaska WQS at 18 AAC 70.030 require that an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. 18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS. 18 AAC 83.335 recommends chronic testing for facilities with dilution factors less than 100:1 at the boundary of the mixing zone, acute testing for facilities with dilution factors greater than 1000:1 at the boundary of the mixing zone, and either acute or chronic testing for dilution factors between 100:1 and 1000:1 at the boundary of the mixing zone.

WET tests are laboratory tests that measure total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. WET testing is included in the permit to demonstrate any potential toxicity resulting from the WWTF discharge. The two different durations of toxicity tests are: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

The previous permit required that the City conduct annual chronic toxicity tests on the test organisms *Crassostrea gigas* (oyster) or *Mytilus sp.* (mussels) and *Atherinops affinis* (topsmelt minnow). The organisms actually used for the WET testing were the mussels, *Mytilus sp.* and the Inland silverside, *Meridia beryllinus.* The organisms were tested at the five following effluent concentrations: 19%, 9.4%, 4.7%, 2.6%, 1.2% and a control. Four WET tests were performed on a quarterly basis during the fourth year of the permit cycle. The WET tests were submitted in November 2018, March 2019, June 2019 and September 2019. Tests performed on *Meridia* were survival and growth, and tests performed on *Mytilus* were for embryo survival and development. Table 3 provides the results of the Valdez WWTF WET testing.

Table 3: Valdez WWTF Chronic WET Testing Results, 2018 – 2019

Start Date	*Mytilus sp*						*Meridia beryllina*					
	Test	TUc (100/NOEC)	TUc (100/IC25)	IC25	NOEC	LOEC	Test	TUc (100/NOEC)	TUc (100/IC25)	IC25	NOEC	LOEC
Nov-18	Development	10.64	<1.0	>100%	50%	100%	Growth	<1.0	<1.0	>100%	100%	>100%
	Survival	92%					Survival	<1.0	<1.0	>100%	100%	>100%
Mar-19	Development	5.3	<1.0	>100%	100%	>100%	Growth	<1.0	<1.0	>100%	100%	>100%
	Survival	93%					Survival	<1.0	<1.0	>100%	100%	>100%
Jun-19	Development	10.6	<1.0	>100%	50%	100%	Growth	5.3	<1.0	>100%	100%	>100%
	Survival	90%					Survival	5.3	<1.0	>100%	100%	>100%
Sep-19	Development	21.2	<1.0	>100%	25%	>100%	Growth	<1.0	<1.0	>100%	100%	>100%
	Survival	83%					Survival	<1.0	<1.0	>100%	100%	>100%

In order to provide ongoing assessment of the toxicity of the Valdez WWTF wastewater discharge, and ensure compliance with 18 AAC 83.335, annual effluent monitoring for WET is required in the permit. WET monitoring in this permit will also satisfy the WET monitoring requirements in Application Form 2A for permit reissuance.

The City will conduct WET testing in the summer season, May 1 – October 31. The NHBWTP is expected to discharge treated bilge water to Valdez WWTF during the summer season.

There are no chronic toxicity effluent limits for this discharge. The permit test dilution series has been changed from the previous permit because the dilution factor (DF) for the chronic mixing zone has changed from 21.2: 1 to 11.9:1. The permit dilution series is 34%, 17%, 8.4%, 4.2%, 2.1%, and a control (0%) and the TUc trigger has been adjusted in this permit from the previous permit. The permit requires accelerated WET testing if the toxicity is greater than or equal to 11.9 TUc in any test. If the toxicity equals or exceeds the permit trigger, six biweekly WET tests (every two weeks over a 12-week period) is required. If the City demonstrates that corrective actions have been implemented, only one accelerated test is required. If toxicity is greater than or equal to 11.9 TUc in any of the accelerated tests, the City must initiate a Toxicity Reduction Evaluation (TRE). A TRE is required so that specific cause of the toxicity can be identified and mitigated (see Permit Section 1.3.6 for further details).

3.5 Receiving Waterbody Limits and Monitoring

Port Valdez is protected for the following uses per 18 AAC 70.020(a)(2)(A) – (D): water supply for aquaculture, seafood processing, and industrial; water recreation, both contact and secondary recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife: and harvesting for consumption of raw mollusks or other raw aquatic life. The City monitored Port Valdez for ammonia, FC bacteria, temperature, pH, and salinity, as described in Part 3.5.1.

3.5.1 Receiving Waterbody Monitoring Requirements

The 2015 permit authorized a chronic mixing zone defined as a rectangle with a width of 66 ft (perpendicular to the shoreline) and a length of 44 ft (parallel to the shoreline) centered on the diffuser, from the seafloor to the surface. The 2015 permit required receiving water monitoring at two monitoring stations for the purpose of monitoring ammonia, pH, FC bacteria, temperature, and salinity. One monitoring station was located outside the authorized chronic mixing zone and the other monitoring station was located inside the boundary of the mixing zone. Monitoring data from October 2015 to October 2019 was used in the development of the permit.

The permit continues to require monitoring of the receiving water at one approved location outside the boundary of the mixing zone to be identified by the permittee and to be approved by the Department. The

permittee is required to identify a new monitoring station location because the chronic mixing zone area in the current permit has been reduced relative to the area of the chronic mixing zone in the previous permit. Monitoring at the boundary of the mixing zone is not required in the permit, because a review of the ambient monitoring results from the previous permitting period demonstrates that WQS were always met at the boundary of the mixing zone. Receiving water monitoring must start within 120 days of the effective date of the permit and continue for the duration of the permit.

The permit authorizes a mixing zone for FC and enterococci bacteria, ammonia, DO, temperature, TRC, copper, and chronic WET. Results of monitoring outside the influence of the facility's discharge will provide information about water quality in the receiving water. Receiving water parameters to be monitored in the current permit must be established in a location outside the influence of the facility's discharge are ammonia and copper. This location will be designated Station AMB, representing ambient condition in Port Valdez. There is no reasonable potential for DO, TRC, temperature, FC or enterococci bacteria to exceed water quality criteria at the boundary of the mixing zone. Chronic WET will not be monitored in the receiving water as chronic WET testing already measures the effluent with respect to an established dilution series, which is consistent with the 2015 permit requirement.

Receiving water monitoring of salinity, pH, and temperature at the monitoring station is required in the permit to determine ammonia water quality criteria for future permit issuances.

Receiving water monitoring requirements for copper is a new condition in the permit.

To the extent practicable, receiving water sample collection must occur on the same day as effluent sample collection for parameters specified in Table 2. Also, when practicable, receiving water monitoring is to take place during different months of the year in the summer and winter seasons. The summer season is defined as the period between May 1 and October 31 and the winter period is defined as the period between November 1 and April 30. Monitoring data collected from receiving waters must be compiled and submitted with the DMR for the month following sample collection per Section 1.5.5 of the permit. Data submitted in the report will be used for future permit issuances. Table 4 lists receiving water monitoring requirements at Station AMB.

Table 4: Station AMB: Ambient Station Monitoring Requirements

Parameter	Units [a]	Sampling Frequency [b]	Sample Type
Total Ammonia as Nitrogen	mg/L	2/year	Grab
pH	S.U.		
Temperature	°C		
Salinity	grams/kilogram		
Copper, total recoverable	µg/L		

Footnotes:
a. Units: mg/L = milligrams per liter, S.U. = standard units, °C = degrees Celsius, µg/L = micrograms per liter.
b. Twice per year means one sample taken May 1 – October 31 and one November 1 - April 30.

4.0 RECEIVING WATERBODY

4.1 Description of Receiving Waterbody

Port Valdez is a glacier-carved fjord, located on the eastern side of Prince William Sound; approximately 25 nautical miles from the Gulf of Alaska and 300 miles east of Anchorage. Port Valdez is classified in Category 3 (definitive water quality data or information to determine if the designated uses are being attained or impaired are limited, inconsistent, or outdated) in *Alaska's Final 2018 Integrated Water Quality Monitoring and Assessment Report* (Alaska's 2018 Integrated Report), June 23, 2020. The fiord has a maximum length of 13

miles and a maximum width of about five miles, with a maximum depth at about 200 feet. The primary freshwater inflow to the bay is from the Lowe River and Valdez Creek, although there are many smaller tributaries. The port at the City of Valdez is North America's most northern ice-free port. The City of Valdez, with a population of about 4,000 people, is located on the north shore of Port Valdez while the Alyeska Marine Terminal resides on the south shore. Commercially, the port at the City of Valdez is an important freight terminal and commercial fishing port and the terminus of the Trans-Alaska Oil Pipeline is at the City of Valdez.

4.2 Outfall Description

The Valdez WWTF continually discharges treated effluent into Port Valdez at a depth of 60 feet below the surface of the water. The outfall terminus is positioned approximately 232 feet from the shoreline. The Outfall 002A terminus is a multiport discharge unit with a diffuser. Geographic coordinates of the outfall are 61° 6' 58.91" North latitude and 146° 16' 50.66" West longitude.

4.3 Water Quality Standards

Section 301(b)(1)(C) of the CWA required the development of limits in permits necessary to meet water quality standards by July 1, 1977. Per 18 AAC 83.435, APDES permits must include conditions to ensure compliance with WQS. Additionally, regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the WQS. The State's WQS are composed of waterbody use classifications, numeric and/or narrative water quality criteria, and an Antidegradation Policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody. The antidegradation policy ensures that the existing uses and the level of water quality necessary to protect the uses are maintained and protected.

Water bodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site–specific water quality criteria per 18 AAC 70.235, such as those listed under18 AAC 70.236(b). The receiving water for this discharge, Port Valdez, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, existing uses and designated uses are the same and Port Valdez must be protected for all marine use classes listed in 18 AAC 70.020(a)(2). These marine water designated uses consist of the following: (A) water supply (aquaculture, seafood processing, and industrial), (B) water recreation (contact and secondary), (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife, and (D) harvesting for consumption of raw mollusks or other raw aquatic life.

4.4 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not, or is not, expected to meet applicable WQS is defined as a "water quality limited segment" and placed on the State's impaired waterbody list. Port Valdez is not included on any of the impaired water body lists catalogued in Alaska's 2020 Integrated Report.

4.5 Mixing Zone Analysis

In accordance with 18 AAC 70.240, the Department may authorize a mixing zone in a permit. Determination of the mixing zone requires an evaluation of critical conditions of the flow regimes of the receiving waterbody, effluent characterization and concentration projections, and discharge rates. These critical conditions are addressed in the permit application. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole and an acute mixing zone is sized to prevent lethality to passing organisms.

In the previous permit, the acute and chronic mixing zones and calculated dilution factors were modeled using CORMIX modeling software. Inputs included the maximum expected effluent concentrations and the acute and chronic WQ criteria of parameters that demonstrated RP (see Appendix B for details on the RPA), as well as any site-specific discharge and ambient data. All other parameters that do not meet WQS at the end of the pipe

meet their respective water quality criteria at the boundary of the chronic mixing zone. In the previous permit, ammonia was the parameter that required the most dilution and the determined the chronic mixing zone size necessary to achieve the ammonia WQS at the boundary of the mixing zone.

For the current permit, DEC conducted an RPA on effluent data reported in DMRs submitted from 2015 – 2020 and determined that the only POCs were copper and ammonia. Other parameters (e.g., cyanide, manganese, nickel, and phosphorus) were identified as possible POCs from expanded effluent results but there were too few data results to conduct RPAs for these parameters. Potential POCs are listed in Table 2 and will be monitored in the current permit in order to build a robust dataset in order to determine RP in future permits.

Acute and chronic aquatic life criteria were calculated for ammonia and copper using data from the ambient water quality monitoring data and in accordance with the RPA Guide. Ambient water pH, salinity, and temperature data were used to calculate chronic and acute aquatic life criteria for ammonia. The most stringent criterion for ammonia is the chronic criterion for the protection of aquatic life, given as 2.6 mg/L in Appendix G of the Toxics Manual. The most stringent criterion for total recoverable copper is the chronic criterion for the protection of aquatic life, 3.7 μg/L.

For the critical receiving water concentration of ammonia present, the 85th percentile of ammonia, pH, and temperature were used in the RPA. There was no receiving water copper concentration available, so the background concentration of copper used in the RPA was 0.058 μg/L; the 15th percentile of the chronic aquatic life criterion for copper. This is consistent with the recommendation provided in the RPA Guide. Ambient data and calculated WQC are summarized in Table 5.

Table 5: Port Valdez Receiving Water Monitoring Results, October 1, 2015 to October 2, 2019

Parameter	Units [a]	Minimum Value	Maximum Value	Concentration Used in RPA Analysis	Calculated WQC for Aquatic Life
Ammonia, as Nitrogen	mg/L	ND [b]	0.64	0.390	2.6

Footnotes:
a) Units: mg/L= milligrams per liter
b) ND = non-detect

DEC received the City's application for reissuance of the permit on February 27, 2020. As part of the application, the City provided laboratory results of the expanded effluent monitoring. The City engaged a contractor, HDR, Inc. (HDR) to use the CORMIX modeling program. To simulate reasonable worst-case conditions, the following were used in the mixing zone modeling: the facility's average daily flow rate of 0.1095 cubic meters per second (m^3/s) and calculated Maximum Projected Effluent Concentrations (MECs) for ammonia. The City compiled an effluent data summary and subsequently performed an RPA following the DEC's recommended procedures from the RPA Guide. In the analysis, the City determined that ammonia was the driving parameter for the mixing zone dimensions. The City requested re-authorization of the previously authorized mixing zone for ammonia and TRC with ammonia as the parameter requiring the most dilution. The City proposed modifications for dilution factors and reduced size of the chronic mixing zone.

In accordance with 18 AAC 70.240, DEC modeled the acute and chronic mixing zones and calculated dilution factors using the CORMIX version 11.0 modeling program. DEC's models yielded different mixing zone sizes than those proposed by the City but also determined ammonia to be the driving parameter for the chronic mixing zone. DEC's analysis was based on inputs to CORMIX that included the MECs and the acute and chronic WQS numeric criteria of ammonia and copper, as well as site-specific discharge and ambient data, effluent performance data from the Valdez WWTF discharge and a facility design flow of 2.5 mgd. More information about the RPA calculations for copper and ammonia can be found in Appendix B.

Differences between the City's and DEC's CORMIX models were primarily due to HDR's not using the criterion maximum concentration (CMC) or criterion continuous concentration (CCC) in the Mixing Zone section of the CORMIX program. HDR calculated the excess concentration of ammonia to be the same as the

ammonia MEC, however, they did not subtract a background concentration of ammonia, as required by the CORMIX program, so the excess concentration of ammonia was slightly higher than the excess concentration calculated by DEC. Additionally, HDR only modeled ammonia as a POC; DEC modeled copper and FC bacteria from effluent data results reported during the previous permitting period. DEC determined that copper was the driver of the acute mixing zone and FC bacteria would not exceed WQS at the boundary of the chronic mixing zone.

In DEC's analysis, ammonia required the most dilution of the parameters that demonstrated RP to exceed water quality criteria, and therefore determined the final chronic mixing zone size. Copper, DO, FC and enterococci bacteria, temperature, TRC, and WET fit within the chronic mixing zone sized for ammonia. The chronic ammonia mixing zone has a dilution factor of 11.9. The chronic mixing zone is defined as a rectangle, with a length of 17 ft and a width of 87 ft, centered on the outfall line over the diffuser, extending from the seafloor to the surface. The length of the mixing zone is oriented parallel to the shoreline.

The acute mixing zone surrounds the outfall and is contained within the larger chronic mixing zone, with copper as the driving parameter. The acute mixing zone has a dilution factor of 2.4. The acute mixing zone is also defined as a rectangle, with a length of 10 ft and a width of 64 ft, centered on the outfall line over the diffuser, extending from the seafloor to the surface and oriented so that the length is parallel to the shoreline. The WQC may be exceeded within the authorized mixing zones. All WQC will be met and apply at the boundary of the chronic mixing zone.

Table 6 shows the dilution factors and mixing zone dimensions used in the previous permit compared to the dilution factors and mixing zone dimensions for this permit.

Table 6: Mixing Zone Dilution Factors (DF) and Dimensions for the Permit

Mixing Zone	Previous Permit [2015] - [2020]				Current Permit [2020] - [2025]			
	DF	Length (ft)	Width (ft)	Area (ft ^{2})	DF	Length(ft)	Width (ft)	Area (ft ^{2})
Acute	4.2	8	62	496	2.4	10	64	640
Chronic	21.2	44	66	2,904	11.9	17	87	1,479

Figure 4 shows a map view of the chronic and acute mixing zones for the permit.

Figure 4: Valdez Wastewater Treatment Facility Chronic and Acute Mixing Zone

According to EPA (1991) and 18 AAC 70.240, lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one-hour time period. Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one-hour exposure is not to exceed the acute criterion. DEC determined that the travel time of an organism drifting through the acute mixing zone to be approximately 2.6 seconds; therefore, there will be no lethality to organisms passing through the acute mixing zone.

Other data required for the mixing zone modeling included: the input of receiving water characteristics at the outfall, such as the depth of the receiving water at the outfall, the ambient velocity, wind velocity, bank configuration and distance of the outfall from the bank, and other features. Based on the inputs, CORMIX predicted the distance at which the parameters would meet WQC as well as the corresponding dilution at the point. Table 7 provides a list of inputs used in the CORMIX modeling program.

Fact Sheet Appendix D outlines criteria that must be met in order for the Department to authorize a mixing zone. These criteria include the size of the mixing zone, treatment technology, and existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species. Table 7 summarizes the Department's mixing zone analysis.

Table 7: Summary of DEC CORMIX Inputs

Parameter Modeled	Excess Concentration	Ambient Concentration	Acute Aquatic Life Criterion	Chronic Aquatic Life Criterion
Ammonia as Nitrogen	26.48 mg/L	0.390 mg/L	17.3 mg/L	2.6 mg/L
Copper - total recoverable	12.83 µg/L	0.56 µg/L	5.8 µg/L	3.7 µg/L
Outfall Characteristics				
Outfall Type & Length	74.37 meters (244 ft) long outfall pipe, terminating in 18.29 m (60 ft) submerged multiport diffuser anchored to the bottom of Port Valdez 7.01 m (23 ft) below mean low water and orientated parallel to the direction of tidal flow. The diffuser is 0.3 m (12 inches) in diameter and contains six 0.2 m (8 inch) diameter ports.			
Port Height above seafloor	0.3 m			
Nearest bank	Left			
Distance to shore	74.37 m			
Port Characteristics	Diameter = 0.3 m, Vertical angle Theta = 90 º, Horizontal angle Sigma = 0 º, Port Heights relative orientation angle Beta = 90 º, Nozzle direction = Same			
Effluent Characteristics				
Flow rate	0.1095 m^3/sec design flow			
Density	996.8 kg/m^3			
Ambient Receiving Water Conditions				
Ocean Depth	6.1 m			
Discharge Depth	5.79 m			
Wind Speed	7 m/sec			
Ambient Velocity	0.1 m/sec			
Near Shore Darcy-Weisbach	0.025			
Pycnocline Height	4.57 m			
Density at Surface ρas	1,006.05 kg/m^3/ º C			
Density at Bottom ρab	1,023.05 kg/m^3/ º C			

4.5.1 Size

In accordance with 18 AAC 70.240(k), the mixing zone must be as small as practicable. In order to ensure that the mixing zone is as small as practicable, DEC used CORMIX to model the chronic and acute mixing zones for seasonal flow rates, effluent temperatures, effluent flow rates and ambient density profiles. 18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. DEC reviewed the most recent five years of DMRs from August 2015 through July 2020 and the City's wastewater discharge application, Form 2A, to determine which parameters had RP to exceed WQ criteria at the end of pipe, and which of the parameters required the most dilution to meet WQ criteria for the chronic and acute mixing zones. Ammonia is the parameter that requires the most dilution to meet chronic WQ criteria in the chronic mixing zone and therefore is the driving parameter. Ammonia was modeled in CORMIX to determine the smallest practicable chronic mixing zone size. Copper required the most dilution in the acute mixing zone to

meet acute WQ criteria. Copper was modeled in CORMIX to determine the smallest practicable acute mixing zone size.

The MECs for ammonia and copper less the ambient ammonia and copper concentrations were entered into CORMIX. The Department followed its RPA Guide to calculate ambient concentrations of ammonia and copper. More information about calculations used to obtain ambient concentrations for copper and ammonia can be found in Part 3.3 and Appendix A.

In accordance with 18 AAC 70.240, the Department determined that the size of the mixing zone for the Valdez WWTF discharge is appropriate. In the permit, the chronic mixing zone size is a rectangle extending from the seafloor to the surface, with a width of 87 ft (perpendicular to the shoreline) and a length of 17 ft (parallel to the shoreline) centered on the diffuser, and an area of 1,479 square feet (ft^2). The chronic mixing zone is authorized for ammonia, FC and enterococci bacteria, DO, temperature, TRC, copper, and WET. The chronic mixing zone size is driven by the dilution required for ammonia; the dilution factor for the chronic mixing zone is 11.9.

The chronic mixing zone in the previous permit was defined as a rectangle having a width of 66 ft (perpendicular to the shoreline) and a length of 44 ft (parallel to the shoreline) with an area of 2,904 ft^2 and a dilution factor of 21.2 The decreased area and dilution factor of the chronic mixing zone size in the current permit is a result of new CORMIX modeling. In the current CORMIX model, effluent data for ammonia collected during the previous five years provided a new excess concentration value for ammonia and ambient monitoring conducted during the previous five years provided a new chronic ammonia criterion and ambient ammonia concentration. The new CORMIX input data resulted in changes to the modeled length and width of the mixing zone and an overall decrease in the chronic mixing zone area compared to the previous permit.

The acute mixing zone is sized according to the dilution required by copper to meet acute aquatic life WQ criteria. The acute mixing zone is based on five years of copper effluent data submitted by the permittee and DMR results from the August 2015 to July 2020. The acute mixing zone has a rectangular shape extending from the seafloor to the surface and is contained within the chronic mixing zone. The acute mixing zone has a width of 64 ft (perpendicular to the shoreline), a length of 10 ft (parallel to the shoreline), and an area of 640 ft^2, centered on the diffuser, established per 18 AAC 70.255. The dilution factor for the acute mixing zone is 2.4. The CORMIX model indicates that water quality criteria would be met relatively rapidly through the acute mixing zone, approximately parallel to the direction of tidal flow. The mixing zone is sized to ensure: 1) the water quality criteria found in 18 AAC 70 are met at the boundary of the mixing zones, 2) the mixing zone is as small as practicable, and 3) compliance with all other applicable mixing zone regulations.

The acute mixing zone in the previous permit was defined as a rectangle having a width of 62 ft (perpendicular to the shoreline) and a length of 8 ft (parallel to the shoreline) with an area of 496 ft^2. The increased area of the mixing zone size in the current permit relative to the previous is a result of new CORMIX modeling and input data for copper, the parameter driving the acute mixing zone in the current permit. In the previous permit, ammonia was the driver of both the acute and chronic mixing zones. Additionally, the acute copper criterion instead of the ammonia acute criterion was used in the mixing zone size determination. The new CORMIX input data resulted in changes to the modeled length and width of the mixing zone and an overall increase in the acute mixing zone area in the current permit as compared to the previous permit.

The relationship between dilution and factors and mixing zone sizes is predicted by CORMIX modeling. Per 18 AAC 83.135 (b)(2), the Department has cause to modify a permit when the Department receives new information that was not available at the time of permit issuance, and the new information would have justified the imposition of different permit conditions at the time of issuance.

4.5.2 Technology

In accordance with 18 AAC 70.240(c)(1), the Department finds that available evidence reasonably demonstrates that the wastewater at the Valdez WWTF will be treated to remove, reduce, and disperse pollutants using

methods found by the Department to be the most effective and technological and economical feasible, consistent with the highest statutory and regulatory treatment requirements.

Wastewater treatment at the Valdez WWTF includes secondary treatment provided by two aerated lagoons, a baffle chlorine contact/settling pond, aeration, and gas chlorination disinfection. Wastewater operations at the WWTF generally exceed minimum treatment standards for wastewater stabilization lagoons found at 40 CFR § 133.105 as adopted by reference in 18 AAC 83.010 (e). The Valdez WWTF achieved 91% average BOD_5 removal and 94% average TSS removal during the previous permitting period, exceeding the 85% removal requirement for both parameters.

4.5.3 Existing Use

In accordance with 18 AAC 70.240(c)(2) and (3) and 18 AAC 70.240(c)(4)(B) and (C), the mixing zone has been appropriately sized to fully protect the existing uses of Port Valdez. Water quality criteria are developed to specifically protect the uses of the waterbody as a whole. Therefore, if the water quality criteria are met in the waterbody then the existing uses are protected. Given that water quality criteria will be met at and beyond the boundary of the chronic mixing zone, the designated and existing uses beyond the boundary of the chronic mixing zone will be maintained and fully protected under the terms of the permit as required in 18 AAC 70.240(c).

The permit reissuance application does not propose any changes that would result in a lower quality effluent. Effluent monitoring and receiving water monitoring have indicated that the discharge neither partially nor completely eliminates an existing use of the waterbody outside of the mixing zone. Furthermore, the results of the most recent five years of WET testing have indicated that toxicity does not exist at levels that would be expected to result in any biological impairment of the waterbody or cause an environmental effect or damage to the ecosystem that the department considers so adverse that a mixing zone is not appropriate.

In DEC's analysis, ammonia required the most dilution of the parameters that demonstrated RP to exceed water quality criteria, and therefore determined the final chronic mixing zone size. Copper, DO, FC and enterococci bacteria, temperature, TRC, and WET fit within the chronic mixing zone sized for ammonia. The chronic ammonia mixing zone has a dilution factor of 11.9, is defined as a rectangle, with a length of 17 ft and a width of 87 ft. The acute mixing zone, with copper as the driving factor, has a dilution factor of 2.4. The acute mixing zone is also defined as a rectangle, with a length of 10 ft and a width of 64 ft. The WQC may be exceeded within the authorized chronic mixing zones. All WQC will be met and apply at the boundary of the chronic mixing zone.

To ensure that existing uses for Port Valdez are protected outside the chronic mixing zone, the City performs WET tests on a periodic basis. WET tests are laboratory tests that measure total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent and is included in the permit to demonstrate any potential toxicity resulting from the WWTF discharge.

During the previous permitting cycle, the City conducted annual chronic toxicity tests on the test organisms *Mytilus sp.* and *Meridia beryllinus.* The organisms were tested at the five following effluent concentrations: 19%, 9.4%, 4.7%, 2.6%, 1.2% and a control. The WET tests were submitted in November 2018, March 2019, June 2019 and September 2019. Tests performed on *Meridia* were survival and growth, and tests performed on *Mytilus* were for embryo survival and development. The results of the four WET tests indicated that the toxic effects from the Valdez WWTF effluent did not exceed the chronic toxicity threshold (TUc = 21.2) that would have required additional WET testing, although the results from the September 2019 WET test showed that that the toxic effects for *Meridia* survival and growth met the threshold limit at the highest effluent concentration. WET tests are required by the current permit on the test organisms *Mytilus sp* for embryo survival and development and *Athenirops affinis* for survival and growth. The WET tests will be conducted every year

during the time period between May 1 and October 31 at the five following effluent concentrations: 34%, 17%, 8.4%, 4.2%, 2.1%, and a control (0%). The permit chronic toxicity trigger is 11.9.

4.5.4 Human Consumption

In accordance with the conditions of the permit, and in accordance with 18 AAC 70.240(d)(6) the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption.

There is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. Additionally, the discharge has not precluded or limited established processing activities or commercial, sport, personal use, or subsistence fish and shellfish harvesting. Signs are required to be posted to inform the public that certain activities such as harvesting of aquatic life for raw consumption and primary contact recreation should not take place in the mixing zone.

4.5.5 Spawning Areas

In accordance with 18 AAC 70.240(f), in lakes, streams, rivers, or other flowing fresh waters, a mixing zone will not be authorized in a spawning area for Arctic grayling northern pike lake trout, brook trout, sheefish, burbot, landlocked coho salmon, chinook salmon, sockeye salmon, or anadromous or resident rainbow trout, Arctic char, Dolly Varden, whitefish, or cutthroat trout.

The mixing zone is authorized in the marine waters of Port Valdez. 18 AAC 70.240(f), which prohibits authorizing mixing zones in streams, rivers or other flowing fresh waters used for anadromous or resident fish spawning, does not apply. Discharges to fresh waters are not authorized under the permit.

Additionally, the Alaska Department of Fish and Game (ADF&G) anadromous waters interactive catalog indicates that the outfall to Port Valdez is located in an area where fish are not known to spawn in the vicinity of the discharge location. DEC contacted Megan Marie ADF&G on May 14, 2020 to inquire about Essential Fish Habitat in Port Valdez, in the vicinity of the outfall, 61º6’ 58.91” N, 146º16’ 50.66” W. DEC requested information about whether this location was in immediate proximity to any spawning areas or migration routes for anadromous fish, or if ADF&G had any other concerns about essential fish habitat in this area. DEC did not receive a response to this inquiry.

4.5.6 Human Health

In accordance with 18 AAC 70.240(d)(1), the mixing zone will not result in pollutants discharged at levels that will bioaccumulate, bioconcentrate, or persist above natural levels in sediments, water, or biota to significantly adverse levels, based on consideration of bioaccumulation and bioconcentration factors, toxicity, and exposure. 18 AAC 70.240(d)(2) states that the mixing zone may not present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by DEC and consistent with 18 AAC 70.025. An analysis of the effluent data that was included with the City’s application for permit reissuance and the results of the RPA conducted on pollutants of concern indicated that the level of treatment is protective of human health. The effluent data was then used in conjunction with applicable WQC, which serve the purpose of protecting human and aquatic life, to size the mixing zone to ensure all WQC are met in the waterbody at the boundary of the mixing zone.

An analysis of the effluent testing data that was included with the Valdez WWTF wastewater discharge application and the results of the RPA conducted on pollutants of concern indicate that the level of treatment at the Valdez WWTF is protective of human health. The quality of the effluent is expected to meet water quality criteria in the receiving water. More information about POCs in the effluent and water quality criteria can be found in Appendix A.

4.5.7 Aquatic Life and Wildlife

In accordance with 18 AAC 70.240, pollutants for which the mixing zone will be authorized will not result in concentrations that result in undesirable or nuisance to aquatic life, cause permanent or irreparable displacement of indigenous organisms, or a reduction in fish or shellfish population levels. Nor will the discharge form a barrier to migration or prevent zone of passage in the receiving water.

Based on a review of effluent data (including WET testing results), outfall structure and location, mixing zone modeling, and tidal velocities at the point of discharge, the Department concludes that the discharge will meet all water quality criteria at the boundary of and outside the mixing zone. DEC determined that the mixing zones will not create a significant adverse effect to fish spawning or rearing, form a barrier to migratory species, fail to provide a zone of passage, result in undesirable or nuisance aquatic life, result in permanent or irreparable displacement of indigenous organism, or result in reduction in fish population levels and that 18 AAC 70.240 are met.

The Alaska Department of Fish and Game (ADF&G) anadromous waters interactive catalog indicates that the outfall to Port Valdez is located in an area where fish are not known to spawn in the vicinity of the discharge location. ADF&G did not respond to an inquiry requesting any additional information about essential fish habitat in the vicinity of the discharge.

DEC performed CORMIX modeling for ammonia and copper. The mixing zone models produced by CORMIX indicate that the travel time of an organism drifting through the acute mixing zone to be approximately 2.6 seconds; therefore, there will be no lethality to organisms passing through the acute mixing zone. In the previous permit, the area of the acute mixing zone was 496 ft^2, smaller than the 640 ft^2 area of the acute mixing zone in the current permit. However, according to EPA (USEPA 1991), lethality to passing organisms would not be expected if an organism passing through the plume along the path of maximum exposure is not exposed to concentrations exceeding the acute criteria when averaged over a one hour time period (18 AAC 70.255(d) – Alternative 4 in Section 5.1.2 of the EPA's Water Quality Standards Handbook, Second Edition, August 1994). Furthermore, the travel time of an organism drifting through the acute mixing zone must be less than approximately 15 minutes if a one-hour exposure is not to exceed the acute criterion (EPA 1991). The time of maximum exposure in the current permit as an organism travels through the acute mixing zone is comparable to the time of maximum exposure in the previous permit, calculated to be three seconds. More information about the size of the chronic and acute mixing zones can be found in Part 4.5.1. Furthermore, the chronic and acute mixing zones sizes predicted by CORMIX modeling demonstrate that WQS will be met at the boundaries of the mixing zones and the mixing zone sizes are as small as practicable. CORMIX models incorporated expected tidal velocities, effluent temperatures, effluent flow rates and ambient density profiles and including the most recent five years of effluent data to determine which parameters had RP to exceed WQ criteria at the end of pipe, and then which of the parameters required the most dilution to meet WQ criteria for the chronic and acute mixing zones. Ammonia is the pollutant that requires the most dilution to meet WQS at the boundary of the chronic mixing zone. All other parameters fit within the chronic mixing zone to meet their respective water quality criteria.

Based on a review of effluent data (including WET testing results), outfall structure and location, mixing zone modeling, and tidal velocities at the point of discharge, the Department concludes that the discharge will meet all water quality criteria at the boundary of and outside the mixing zone.

4.5.8 Endangered Species

In accordance with 18 AAC 70.240(c)(4)(F), the mixing zone will not cause an adverse effect on threatened or endangered species.

On April 27, 2020, DEC received the following communication from Jennifer Spegon, with the United States Fish & Wildlife Service (USFWS):

"The Service has developed an online tool to help produce a species lists, it's called IPaC (Information, Planning, and Conservation), and it was developed to help streamline the Endangered Species Act, section 7 consultation process. This web-based tool is a decision support system that allows our partners to explore the landscape and download a preliminary or an official species list. The online tool provides species lists for actions authorized, funded or carried out by federal agencies. The species list fulfills the requirement, under section 7(c) of the Endangered Species Act, to provide a list of threatened and endangered species upon request for federal actions and National Environmental Policy Act compliance."

The IPaC tool at the website, yielded the following result for Port Valdez: "There are no endangered species expected to occur at this location."

No detrimental effects to fauna in the area have been documented with previously authorized mixing zones for the facility, nor does the mixing zone appear to pose an undesirable nuisance to aquatic life. The RPA and CORMIX modeling resulted in an overall decrease in the area of the chronic mixing zone, although the area of the acute mixing zone has increased in size, compared to the previous permit. Even though the area of the acute mixing zone size has increased, relative to the previous permit, CORMIX modeling predicts that lethality to passing organisms in the acute mixing zone is 2.6 seconds, comparable to 3 seconds predicted in the previous permit. The reduction in area of the chronic mixing zone reduces the possibility for any threatened or endangered species in the area to come into contact with the treated wastewater. More information about the size of the chronic and acute mixing zones can be found in Part 4.5.1.

Due to the reduced size of the chronic mixing zone and short residence time of pollutants in the acute mixing zone, even considering the increase in overall area of the acute mixing zone, DEC has concluded that the mixing zones do not cause an adverse effect on threatened or endangered species in the vicinity of the discharge. More information about lethality to passing organisms in the acute mixing zone can be found in Part 4.5.7. DEC will provide a copy of the permit and fact sheet to NMFS and USF&WS when it is publicly noticed. Any comments received from the agencies regarding endangered species will be considered prior to issuance of the permit.

5.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "interim effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit, unless the circumstances on which the previous permit was based have materially and substantially changed since the permit was issued, and the change in circumstances would cause for permit modification or revocation and reissuance under 18 AAC 83.135."18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued."

Effluent limitations may be relaxed as allowed under 18 AAC 83.480, CWA §402(o) and CWA §303(d)(4). 18 AAC 83.480(b) allows relaxed limitations in renewed, reissued, or modified permits when there have been material and substantial alterations or additions to the permitted facility that justify the relaxation, or, if the Department determines that technical mistakes were made.

Permit monitoring requirements that changed since the previous permit are requirements to monitor the following parameters: enterococci bacteria, zinc, cyanide, phosphorus, manganese, nickel, TAH, and TAqH

New effluent limits for ammonia and copper are required in the permit. The 2015 permit required monitoring only for ammonia and copper. The permit establishes 23 mg/L and 41 mg/L, respectively, for AML and DML ammonia effluent limits. The permit also establishes 9 μg/L and 13 μg/L AML and DML copper effluent limits.

The effluent limitations in this permit reissuance are consistent with 18 AAC 83.480. Therefore, the permit effluent limitations, standards, and conditions in AK0021431 are as stringent as in the previously issued permit. Accordingly, no further backsliding analysis is required for this permit reissuance.

6.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's Antidegradation policy. The State's Antidegradation policy is found in the 18 AAC 70 Water Quality Standards (WQS) regulations at 18 AAC 70.015. The Department's approach to implementing the Antidegradation policy is found in 18 AAC 70.016 *Antidegradation implementation methods for discharges authorized under the federal Clean Water Act*. Both the Antidegradation policy and the implementation methods are consistent with 40 CFR 131.12 and approved by EPA. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation policy and implementation methods.

Using the policy and corresponding implementation methods, the Department determines a Tier 1 or Tier 2 classification and protection level on a parameter by parameter basis. A Tier 3 protection level applies to a designated water. At this time, no Tier 3 waters have been designated in Alaska.

18 AAC 70.015(a)(1) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected (Tier 1 protection level).

Port Valdez is listed in Category 3 in DEC's most recent Integrated Report (Alaska's 2018 Integrated Report). Waters listed in Category 3 lack sufficient information for DEC to make an impairment or attainment determination.

Antidegradation analysis conservatively assumes that the Tier 2 protection level applies to all other parameters, consistent with 18 AAC 70.016(c)(1).

18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected, unless the Department authorizes a reduction in water quality (Tier 2 protection level).

The Department may allow a reduction of water quality only after the specific analysis and requirements under 18 AAC 70.016(b)(5)(A-C), 18 AAC 70.016(c)(7)(A-F), and 18 AAC 70.016(d) are met. The Department's findings are as follows:

> ***18 AAC 70.016(b)(5)***
>
> ***(A)*** *existing uses and the water quality necessary for protection of existing uses have been identified based on available evidence, including water quality and use related data, information submitted by the applicant, and water quality and use related data and information received during public comment;*
>
> ***(B)*** *existing uses will be maintained and protected; and*
>
> ***(C)*** *the discharge will not cause water quality to be lowered further where the department finds that the parameter already exceeds applicable criteria in 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b).*

The water quality criteria, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. Per 18 AAC 70.020 and 18 AAC 70.050 all marine waters are protected for all uses; therefore, the most stringent water quality criteria found in 18 AAC 70.020 and in the Toxics Manual apply and were evaluated. This will ensure existing uses and the water quality necessary for protection of existing uses of the receiving waterbody are fully maintained and protected.

The permit places limits and conditions on the discharge of pollutants. The limits and conditions are established after comparing TBELs and WQBELs and applying the more restrictive of these limits. The WQ criteria, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. WQBELs are set equal to the most stringent water quality criteria available for any of the protected water use classes.

Conventional pollutants of concern in domestic wastewater are BOD_5, TSS, and pH. Additional domestic wastewater pollutants are temperature, DO, ammonia, FC and enterococci bacteria, and WET. Other pollutants of concern in the Valdez WWTF effluent are cyanide, phosphorus, nickel, manganese, TAH, TAqH, copper, zinc, and TRC. The permit includes numeric effluent limits or continued monitoring addressing each of these pollutants of concern. The permit requires facilities to continue to maintain an O&M Plan to minimize the production of waste and the discharge of pollutants to waters of the U.S., to ensure that domestic wastewater facilities provide for the protection or attainment of existing and designated uses.

The Department concludes the terms and conditions of the permit will be adequate to fully protect and maintain the existing uses of the water and that the findings under 18 AAC 70.016(b)(5) are met.

18 AAC 70.016(c)(7)(A –F) *if, after review of available evidence, the department finds that the proposed discharge will lower water quality in the receiving water, the department will not authorize a discharge unless the department finds that*

> ***18 AAC 70.016(c)(7)(A)*** *the reduction of water quality meets the applicable criteria of 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b), unless allowed under 18 AAC 70.200, 18 AAC 70.210, or 18 AAC 70.240;*

As previously stated, Section 1.2.2 of the permit requires that the discharge shall not cause or contribute to a violation of the WQS at 18 AAC 70. WQBELs are set equal to the most stringent water quality criteria available under 18 AAC 70.020(b) for any of the protected water use classes. Because of the nature of the permitted discharges, other pollutants are not expected to be present in the discharges at levels that would cause, have the reasonable potential to cause, or contribute to an exceedance of any Alaska WQS.

Fact Sheet Part 4.5: Mixing Zone Analysis of the permit requires that the discharge shall not cause a violation of the WQS except if excursions are authorized in accordance with provisions in 18 AAC 70.200 – 70.240 (i.e., mixing zone, variance, etc.).

As a result of the Valdez WWTF reasonable potential to exceed water quality criteria for ammonia, FC and enterococci bacteria, DO, temperature, TRC, and copper, and available assimilative capacity in the receiving water, a mixing zone is authorized in the wastewater discharge permit in accordance with 18 AAC 70.240. More information about the Valdez WWTF mixing zone can be found in Fact Sheet Part 4.5. The resulting effluent end-of-pipe limits and monitoring requirements in the permit protect water quality criteria, and therefore, will not violate the water quality criteria found at 18 AAC 70.020 beyond the boundary of the authorized mixing zone. An acute mixing zone contained within the boundary of the chronic mixing zone has been authorized in the permit, consistent with 18 AAC 70.240(d)(7), to ensure no lethality to passing organisms occurs. The area of the chronic mixing zone has decreased from the previous permit, but the area of the acute mixing zone is increased from that authorized in the previous permit. Both the decreased size of the chronic mixing zone and the increased size of the acute mixing zone in the current permit are due to mixing zone modeling characterizations calculated with new data for effluent and ambient ammonia concentrations and effluent copper concentrations. More information about the sizes of the chronic and acute mixing zones for the Valdez WWTF can be found in Fact Sheet Part 4.5.1. Even considering the changes in the chronic and acute mixing zone sizes and dilution factors relative to the previous permit, DEC is assured that WQS will be met at the boundaries of the mixing zones.

The permit reissuance application does not propose any changes that would likely result in wastewater of lower quality to be discharged than has been discharged under the previously issued NPDES permit or the previous APDES permit for the Valdez WWTF. The Alaska WQS, upon which the permit effluent limits are based, serve the specific purposes of protecting the existing and designated uses.

Based on the results of the RPA, there are WET requirements imposed by the permit. The permittee must conduct WET tests one time per year, at a minimum, to determine if the effluent is creating toxicity in the

receiving water beyond the boundary of the authorized chronic mixing zone. If WET tests reveal that the discharge could have toxicity beyond the boundary of the chronic mixing zone, the permittee shall perform accelerated testing and identify the source of the toxicity. The permittee must notify DEC of the exceedance in writing within two weeks of receipt of test results. WET results from this permit issuance will be used when the permittee applies for reissuance of the permit to ensure the applicable criteria of 18 AAC 70.030 are met.

Site-specific criteria as allowed by 18 AAC 70.235 have not been established for the Valdez WWTF, as listed in 18 AAC 70.236(b), and are therefore not applicable. The permit does not authorize short term variance or zones of deposit under 18 AAC 70.200 or 18 AAC 70.210; therefore does not apply.

The Department has determined the reduction of water quality meets the applicable criteria of 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b), and that the finding is met.

18 AAC 70.016(c)(7)(B) *each requirement under (b)(5) of this section for a discharge to a Tier 1 water is met;*

See 18 AAC 70.016(b)(5) analysis and findings above.

18 AAC 70.016(c)(7)(C) *point source and state-regulated nonpoint source discharges to the receiving water will meet requirements under 18 AAC 70.015(a)(2)(D); to make this finding the department will (i) identify point sources and state-regulated nonpoint sources that discharge to, or otherwise impact, the receiving water;* and *(ii) consider whether there are outstanding noncompliance issues with point source permits or required state-regulated nonpoint source best management practices, consider whether receiving water quality has improved or degraded over time, and, if necessary and appropriate, take actions that will achieve the requirements of 18 AAC 70.015(a)(2)(D); and (iii) coordinate with other state or federal agencies as necessary to comply with (i) and (ii) of this subparagraph;*

The requirements under 18 AAC 70.015(a)(2)(D) state:

(D) all wastes and other substances discharged will be treated and controlled to achieve

(i) for new and existing point sources, the highest statutory and regulatory requirements; and

(ii) for nonpoint sources, all cost-effective and reasonable best management practices;

The highest statutory and regulatory requirements are defined at 18 AAC 70.015(d):

(d) For purposes of (a) of this section, the highest statutory and regulatory requirements are

(1) any federal technology-based effluent limitation identified in 40 C.F.R. 122.29 and 125.3, revised as of July 1, 2017 and adopted by reference;

(2) any minimum treatment standards identified in 18 AAC 72.050;

(3) any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter; and

(4) any water quality-based effluent limitations established in accordance with 33 U.S.C. 1311(b)(1)(C) (Clean Water Act, sec. 301(b)(1)(C)).

The first part of the definition includes all federal technology-based effluent limit guidelines (ELGs) including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at 40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e). The ELGs set standards of performance for existing and new sources and are incorporated in the permit.

The second part of the definition references the minimum treatment standards for domestic wastewater discharges found at 18 AAC 72.050. The conditions of this permit require the permittee to meet or exceed the minimum treatment standards described in 18 AAC 72.050. Wastewater operations at the Valdez WWTF regularly exceed minimal percent removal and concentration based secondary treatment requirements for POTWs at 40 CFR § 133.102 and 18 AAC 72.050. The facility includes primary treatment, secondary treatment

and disinfection through chlorination which achieves the highest statutory and regulatory requirements. The Department finds that this requirement is met.

The third part of the definition refers to treatment requirements imposed under another state law that are more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that apply to this permitting action include 18 AAC 15 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72, nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

The fourth part of the definition refers to WQBELS. WQBELs are designed to ensure that the WQS of a waterbody are met and may be more stringent than TBELs. Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet WQS by July 1, 1977. WQBELs included in APDES permits are derived from EPA-approved 18 AAC 70 WQS. APDES regulation 18 AAC 83.435(a)(1) requires that permits include WQBELs that can "achieve water quality standard established under CWA §303, including state narrative criteria for water quality." The permit requires compliance with the 18 AAC 70 WQS, includes effluent limits for copper, ammonia, TRC, DO, and pH, and monitoring for other applicable WQS pollutants.

The Department reviewed available information on known point source discharges to receiving waters covered under the permit and found no outstanding noncompliance issues.

After review of the methods of treatment and control and the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge authorized under this general permit meets the highest applicable statutory and regulatory requirements; therefore, 18 AAC 70.016(c)(7)(C) finding is met.

18 AAC 70.016(c)(7)(D)(i-ii) *the alternatives analysis provided under (4)(C-F) of this subsection demonstrates that*

(i) a lowering of water quality under 18 AAC 70.015(a)(2)(A) is necessary; when one or more practicable alternatives that would prevent or lessen the degradation associated with the proposed discharge are identified, the department will select one of the alternatives for implementation; and

(ii) the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the department to be the most effective and practicable.

The City submitted a revised antidegradation analysis in the required Antidegradation Form 2G that included an alternatives analysis to address (4)(C-F) of this subsection.

(i) According to the City's alternatives analysis, the revised application is for a new or expanded discharge, meaning a discharge that is regulated for the first time. The City found that the discharge requires a Tier 2 analysis as defined under 18 AAC 70.016(c)(2)A) – (E). As part of the City's analysis, the City made a statement that an antidegradation Tier 2 analysis has been triggered for the first time for the Valdez WWTF in relation to copper concentrations in the effluent and the associated mixing zone. As noted by the Department, the facility operations and influent composition have not changed. Thus, the concentrations of copper in the effluent are expected to be similar to historical values. Therefore, the Valdez WWTF effluent discharges of copper are unlikely to degrade or impact the water quality of Port Valdez due to the continued use of a multi-port diffuser that will provide sufficient dilution to avoid degradation beyond the mixing zone in the port area. The City's analysis of a range of practicable alternatives that have the potential to prevent or lessen the degradation associated with the proposed copper discharge per 18 AAC 70.015(c)(4) is provided below:

a. The City has limited background data on copper in the drinking water and sanitary sewer systems. Reported copper concentrations in the distribution system come from the City's quarterly lead and copper sampling. This data is the best available information, but the limited nature of the sampling makes it difficult to develop strong correlations between detected copper concentrations leaving the distribution system and the copper concentrations entering the

wastewater. Corrosion of drinking water systems and plumbing has been established as one of the major contributors of metals to wastewater. In the case of Valdez, corrosion of copper, brass, bronze, and galvanized metals is likely to be the single largest contributor of metals as the City lacks smelting, semiconductor, electroplating, paint manufacturing, large volume color printing, or wood preservative operations - industries that typically release large quantities of heavy metals into municipal sewer systems. Currently, there are three water systems operating in the City of Valdez; City (Town) System, South Central System, and Robe River System (although the Robe River system is not currently on the City sewer system). Currently the City does not treat the water with any chemicals (including corrosion inhibitors) prior to being sent to the water distribution system. Based on conversations with City staff, all of the City water services lines in town are copper. One potential 'treatment' option that may be employed on the drinking water system is the inclusion of corrosion control chemicals to minimize corrosion in the drinking water distribution system. The use of orthophosphates alone or blending with polyphosphates has been recommended by EPA for reducing lead and copper corrosion in plumbing systems for compliance with the federal Lead and Copper Rule. For the purposes of this analysis, it is assumed the City could add a 100 percent orthophosphate solution, such as phosphoric acid, to assist in corrosion control in the water distribution system. However, to counteract the acid's pH depression, caustic soda (sodium hydroxide) might need to be added to maintain the current water pH. For this alternative, it is assumed that each well house would have to be added onto or a separate structure would have to be constructed at three different well sites to house the required chemical feed equipment. It is assumed that a building addition or a separate building/structure would have to be constructed at each well site to house the treatment systems. The probable total cost of chemical action corrosion control was calculated to be $3,560,250. At this time, it is not known if corrosion control alone would reduce copper to a point where the City would meet the potential marine criteria at end of pipe.

b. Another alternative considered for removing copper would be to add unit processes at the WWTF to target the removal of metals. It is assumed for this evaluation that the process would be added after the existing lagoons (after organics and solids have been largely removed). The process for removing copper to the required level would likely involve chemical precipitation and removal of the particles with enhanced clarification (Actiflo) or filtration. It is assumed that a separate building/structure would have to be constructed to house the treatment systems. The probable total cost of copper removal at the Valdez WWTF was calculated to be $13,063,250. The rough order of magnitude opinions of probable cost for the development of copper removal processes at the WWTP and development of corrosion control chemical feed systems at the City well houses include estimated construction dollars, contingencies, administration, and engineering fees. Construction costs are based on conceptual alternatives. The costs have been estimated based on information from cost estimating guides and experience gained while designing similar facilities. Even considering the cost of construction of a copper removal system, the cost estimates do not provide a life-cycle cost analysis of long-term impacts to the City. On top of an overall increased operational complexity for metals removal, long term costs for chemical addition, energy usage, and additional maintenance requirements would result in a significant annual operations and maintenance cost increase. Adding advanced treatment at the WWTF would be very costly and cross-media and ancillary effects would be similar to corrosion control but much greater in magnitude than that alternative. These would include a likely increase in chemical (iron- or aluminum-based precipitant) discharge from the WWTF and other effects associated with chemical manufacturing and shipping and an increase in energy consumption for heat and electrical needs at the new treatment building.

c. Utilizing a mixing zone as allowed by 18 AAC 70.240 would result in no additional costs to the facility while allowing only limited water quality degradation within a relatively small mixing zone. Permit limitations that restrict the effluent discharge will ensure that water quality criteria

will not be exceeded at the boundary of, or beyond, the mixing zone. The discharge of has been allowed in the past (i.e., while to be newly regulated, discharges of this parameter are not demonstratively increasing). In addition, the Port of Valdez has assimilative capacity and there has been no observed evidence of adverse biological effects in the receiving water in the vicinity of the outfall (e.g., such as fish kills or depletion of flora or fauna), indicating existing uses will be protected. Also, WET testing conducted during the previous two and a half years, did not show toxic effects on organisms exposed to the Valdez WWTF effluent. More information about WET testing in the receiving water can be found in Fact Sheet Part 3.4.

d. The City did not identify a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts.

The Department has determined that the discharge under the limitations and requirements of the permit is identified as the only practicable alternative; therefore 18 AAC 70.016(c)(7)(D)(i) finding is met.

(ii) The methods of prevention, control, and treatment the Department finds to be most effective and reasonable are currently in use at the facility and include meeting federal (40 CFR 133) and state (18 AAC 72.050) requirements. The Valdez WWTF utilizes a variety of measures to prevent, control and treat the pollution that may be generated as a result of the facility's wastewater treatment operations, as described in Fact Sheet Part 2.2. The facility O&M Plan establishes standard operational procedures and regular maintenance schedules for the prevention, control, and treatment of all wastes and other substances discharged from the facility. The O&M Plan that prevents or minimizes the release of pollutants into Port Valdez include minimum components such as preventative maintenance, spill prevention, water conservation, and public information and education. Section 2.6 of the permit requires that pollutants removed in the course of treatment such as screenings and grit be disposed of in accordance with Alaska Solid Waste Management Regulations at 18 AAC 60.

The Department has determined that the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the department to be the most effective and practicable; therefore 18 AAC 70.016(c)(7)(D)(ii) finding is met.

18 AAC 70.016(c)(7)*(E) except if not required under (4)(F) of this subsection, the social or economic importance analysis provided under (4)(G) and (5) of this subsection demonstrates that a lowering of water quality accommodates important social or economic development under 18 AAC 70.015(a)(2)(A);*

The community of Valdez has been discharging wastewater to Port Valdez under the NPDES Program since 1978 and under the APDES program since 2015. The facility currently serves an estimated population of 3,976 (2010 census). The community's entire sewer infrastructure has been constructed and expanded over the years to drain to the community's treatment facility that discharges to Port Valdez. Further, as previously mentioned, the Department has found that the facility routinely produces effluent quality far exceeding the secondary treatment requirement of 40 CFR Part 133, adopted by reference at 18 AAC 83.010. There are important social and economic factors to consider. Direct impacts would be to the employment of workers at the Valdez WWTF. The facility provides community services and associated infrastructure improvements for a number of residential units and commercial and industrial users. The City estimates that the amount of sewage treated provides substantial health and safety benefits. The Valdez WWTF also provides education and training to its staff and public tours of the treatment facilities. Together, these services foster cultural and recreational facilities on land and in the receiving water. The facility's continued operation is important to the public health and the regional economy, as well as the overall economic and social development of the State of Alaska.

The Department has determined that the operation of the WWTF and the discharges authorized by the permit demonstrates that a lowering of water quality accommodates important social or economic development; therefore, 18 AAC 70.016(c)(7)(E) finding is met.

18 AAC 70.016(c)(7)(F) *18 AAC 70.015 and this section have been applied consistent with 33 U.S.C. 1326 (Clean Water Act, sec. 316) with regard to potential thermal discharge impairments.*

Discharges authorized under the permit are not associated with a potential thermal discharge impairment; therefore, the finding is not applicable.

7.0 OTHER PERMIT CONDITIONS

7.1 Quality Assurance Project Plan

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to update, implement and/or maintain the QAPP. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; precision and accuracy requirements; data reporting, including method detection/reporting limits; and quality assurance/quality control criteria. The permittee is required to amend the QAPP whenever any procedure addressed by the QAPP is modified. The plan shall be retained on site and made available to the Department upon request.

7.2 Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limitations, monitoring requirements, and all other permit requirements at all times. The permittee is required to review and update the O&M Plan that was required under the previous permit within 120 days of the effective date of the final permit to ensure that it includes appropriate best management practices and pollution prevention measures. The plan shall be retained on site and made available to the Department upon request.

7.3 Facility Planning Requirement

The previous permit included a facility planning requirement, directing the permittee to compute an annual average value of the flow entering the facility based on the previous twelve months of data or all data available; whichever value was less. Further, when the annual average values for flow entering the facility exceeded 85% the facility planning valued reported, the permitted was required to develop a facility plan and schedule within one year from the date of the first exceedance. The plan would have included the permittee's strategy for continuing to maintain compliance with effluent limits as was to be made available to DEC upon request. The permit does not contain a facility planning requirement, as there are no planned upgrades to the facility and the flow during the previous five years did not exceed 85% of 1.5 mgd, the average flow rate listed as the facility planning rate.

7.4 Industrial User Survey

18 AAC 83.340 requires POTWs to identify and locate all Significant Industrial Users (SIUs) that discharge process wastewaters and associated pollutants to their wastewater treatment system. General and specific pretreatment prohibitions at 40 CFR 403.5, adopted by reference at 18 AAC 83.010(g)(2), contain prohibitions that apply to each industrial user introducing pollutants into a POTW, whether or not the industrial user is subject to other National Pretreatment Standards, or any national, State, or local Pretreatment Requirements. Therefore, in order to assess whether an industry or business has the potential to violate any general or specific pretreatment prohibition, and to determine if a pretreatment program should be developed and/or if pretreatment requirements should be included in the Valdez WWTF wastewater discharge permit, the permittee is required to submit with their permit reissuance application, Form 2A, a list of those industries or businesses that discharge and/or have the potential to discharge non-domestic wastewater to the Valdez WWTF''s collection system. DEC may request further information on specific industries or business to assist in this evaluation.

7.5 Electronic Discharge Monitoring Report

The permittee must submit DMR data electronically through NetDMR per Phase I of the E-Reporting Rule (40 CFR 127) upon the effective date of the permit. Authorized persons may access permit information by logging into the NetDMR Portal (https://cdxnodengn.epa.gov/oeca-netdmr-web/action/login). DMRs submitted in compliance with the E-Reporting Rule are not required to be submitted as described in permit APPENDIX A – Standard Conditions unless requested or approved by the Department. Any DMR data required by the Permit that cannot be reported in a NetDMR field (e.g. mixing zone receiving water data, etc.), shall be included as an attachment to the NetDMR submittal. DEC has established an e-Reporting Information website at https://dec.alaska.gov/water/compliance/electronic-reporting-rule that contains general information about this new reporting format. Training materials and webinars for NetDMR can be found at https://netdmr.zendesk.com/home.

Phase II of the E-Reporting rule will integrate electronic reporting for all other reports required by the Permit (e.g., Annual Reports and Certifications) and implementation is expected to occur during the term of the permit. Permittees should monitor DEC's E-Reporting Information website (http://dec.alaska.gov/water/compliance/electronic-reporting-rule) for updates on Phase II of the E-Reporting Rule and will be notified when they must begin submitting all other reports electronically. Until such time, other reports required by the Permit may be submitted in accordance with permit APPENDIX A – Standard Conditions.

7.6 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

8.0 OTHER LEGAL REQUIREMENTS

8.1 Ocean Discharge Criteria Evaluation

Section 403(a) of the CWA, Ocean Discharge Criteria, prohibits the issuance of a permit under Section 402 of the CWA for a discharge into the territorial sea, the water of the contiguous zone, or the oceans except in compliance with Section 403. Permits for discharges seaward of the baseline of the territorial seas must comply with the requirements of Section 403, which include development of an Ocean Discharge Criteria Evaluation (ODCE).

Interactive nautical charts depicting Alaska's baseline plus additional boundary lines are available at https://www.charts.noaa.gov/ChartCatalog/Alaska.html and interactive maps at https://alaskafisheries.noaa.gov/mapping/arcgis/rest/services/NOAA_Baseline/MapServer.

The charts and maps are provided for information purposes only. The U.S. Baseline committee makes the official determinations on baseline. Ocean Discharge Criteria are not applicable for marine discharges to areas located landward of the baseline of the territorial sea.

A review of the baseline line maps revealed that the Valdez WWTF Outfall 002A terminus is positioned landward of the baseline of the territorial sea; therefore, Section 403 of the CWA does not apply to the permit, and an ODCE analysis is not required to be completed for this permit reissuance. Further, the permit requires compliance with WQS such that 40 CFR 125.122(b) is met and therefore the discharge is presumed not to cause unreasonable degradation of the marine environment.

8.2 Endangered Species Act

The National Marine Fisheries Service (NMFS) is responsible for administration of the Endangered Species Act (ESA) for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the United States Fish & Wildlife Service (USFWS).

Per Section 7 of the Endangered Species Act (ESA) federal agencies are required to consult with the National Oceanic and Atmospheric Administration (NOAA), NMFS and the USFWS if their actions could beneficially or adversely affect any threatened or endangered species. As a state agency, DEC is not required to consult under Section 7 with these federal agencies regarding wastewater discharge permitting actions. However, this does not absolve DEC from complying with Section 9 and 10 of the ESA. DEC voluntarily contacted the agencies to notify them of the proposed permit issuance and to obtain listings of threatened and endangered species near the discharge.

DEC contacted the USFWS and the NMFS on April 20, 2020 and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of the Valdez WWTF outfall.

On April 21, 2020, DEC received an e-mail message from Ms. Jennifer Spegon of the USFWS referring DEC to consult the website, http://ecos.fws.gov/ipac for listings of endangered species in the vicinity of Port Valdez. A subsequent review of this website yielded a result that there are no endangered species in Port Valdez.

This fact sheet and the permit will be submitted to the agencies for review during the public notice period and any comments received from these agencies will be considered prior to issuance of the permit.

8.3 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH.

DEC contacted ADF&G on May 14, 2020 and requested they identify any concerns regarding Essential Fish Habitat or in the vicinity of the Valdez WWTF outfall. ADF&G did not respond to the inquiry.

The Department accessed EFH information via use of NOAA's Habitat Conservation Interactive EFH Mapper located at: https://www.habitat.noaa.gov/protection/efh/efhmapper/ .The Data Query Tool was used for the Port of Valdez, near the Valdez WWTF outfall location. This tool indicated that no Habitat Areas of Particular Concern nor EFH areas protected from fishing were identified at the location.

This fact sheet and the permit will be submitted to the agencies for review during the public notice period and any comments received from these agencies will be considered prior to issuance of the permit.

8.4 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittee must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

8.4.1 State Requirements

The Department separates wastewater and biosolids permitting. The permittee should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittee can access the Department's Solid Waste Program web page for more information and who to contact.

8.4.2 Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittee should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittee is required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [see also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. The application form is NPDES Form 2S and can be found on EPA's website, www.epa.gov , under NPDES forms. A completed NPDES Form 2S should be submitted to:

U.S. Environmental Protection Agency
Region 10, NPDES Permits Unit OWW-130
Attention: Biosolids Contact
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

The EPA Region 10 telephone number is 1-800-424-4372. Information about EPA's biosolids program and CWA Part 503 is available at www.epa.gov and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

8.5 Permit Expiration

The permit will expire five years from the effective date of the permit.

9.0 REFERENCES

Alaska Department of Environmental Conservation, "Alaska's Final 2018 Integrated Water Quality Monitoring and Assessment Report," June 23, 2020.

Alaska Department of Environmental Conservation. 18 AAC 70 Water quality standards, as amended through March 5, 2020.

Alaska Department of Environmental Conservation, "Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances," as amended through December 12, 2008.

Alaska Department of Environmental Conservation, "Alaska Pollutant Discharge Elimination System permits reasonable potential analysis and effluent limits development guide." 2014

Alaska Department of Fish & Game, *"Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes"* and associated Atlas. 2019.

Koch, Brad (bkoch@valdezak.gov) "AK0021431 Valdez Wastewater Treatment Facility Reissuance Application", February 20, 2020.

Koch, Brad (bkoch@valdezak.gov) "AK0021431 Valdez Wastewater Treatment Facility Reissuance Application – Antidegradation Form 2G (revised)", October 21, 2020.

Marie, Megan (megan.marie@alaska.gov) "RE: Essential Fish Habitat - APDES Permit AK0021431 City of Valdez Wastewater Treatment Facility", May 14, 2020.

Moyers, Ryan P.E., HDR "Valdez Wastewater Treatment Plant Outfall Antidegradation Analysis", October 19, 2020.

Spegon, Jennifer (Jennifer_j_spegon@fws.gov) "Endangered Species & Critical Habitat: APDES Permit AK0021431 City of Valdez Wastewater Treatment Facility", April 27, 2020.

Toomey, David (dtoomey@valdezak.gov) "RE: Is it possible to get lab reports for the Valdez WWTP DMRs from October 2015 - October 2016?", March 17, 2020.

USEPA, "EPA Regions 8, 9 and 10 Toxicity Training Tool," January 2010.

USEPA, "Technical Support Document for Water Quality-based Toxics Control," EPA/505/2-90-001, USEPA Office of Water, Washington, DC, March 1991.

USEPA, "Water Quality Standards Handbook: Second Edition," EPA-823-B-94-005a, USEPA, Washington, DC, August 1994.

USEPA, "Alaska DEC NPDES Permit Writer's Course" Reference Manual. May 2019.U.S. Fish and Wildlife Service, 2014. Information, Planning and Conservation System Initial Project Scoping website. https://ecos.fws.gov/ipac/

http://www.worldportsource.com/ports/review/USA_AK_Port_of_Valdez_763.php

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APPENDIX A- BASIS FOR EFFLUENT LIMITATIONS

The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limit standards found at Title 40 Code of Federal Regulations (40 CFR) 133, adopted by reference in Alaska Administrative Code (AAC) 18 AAC 83.010(e). The Department may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that secondary treatment effluent limits are not sufficiently stringent to meet Alaska water quality standards (WQS). In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

Secondary treatment effluent limits for POTWs do not limit every pollutant that may be present in the effluent. Limits have only been developed for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW. When technology-based effluent limits (TBELs) do not exist for a particular pollutant expected to be present in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water quality criteria (WQC) for the waterbody. If a pollutant causes or contributes to an exceedance of a WQC, a WQBEL for the pollutant must be established in the permit.

A.1 Secondary Treatment Effluent Limitations

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The secondary treatment standards in 40 CFR §133.102, which the Department has adopted in 18 AAC 83.010(e), are TBELs that apply to all municipal wastewater treatment facilities and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133, the State of Alaska requires maximum daily limitations (MDLs) for BOD_5 and TSS in its own secondary treatment regulations (18 AAC 72.990(59)), listed in Table A-1.

Table A- 1: Secondary Treatment Effluent Limits

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Minimum Removal
BOD_5	mg/L	30	45	60	85%
TSS	mg/L	30	45	60	
pH	S.U.	6.0 – 9.0 S.U. at all times			

A.2 Mass-Based Limitations

Per 18 AAC 83.540 effluent limits are required to be expressed in terms of mass unless they cannot appropriately be expressed by mass, if it is infeasible, or if the limits can be expressed in terms of other units of measurement. The regulation at 18 AAC 83.520 requires that effluent limits for a POTW be calculated based on the design flow of the facility. For this facility, an average daily flow of 1.5 mgd is carried forward from the prior permit and used to calculate mass based limitations. The mass based limits are expressed in pounds per day (lbs/day) and are calculated as follows:

Mass based limit (lbs/day) = concentration limit (mg/L) × monthly design flow (mgd) × 8.34

Where: 8.34 is a conversion factor with units (lbs x L) / (mg x gallon x 10^6)

A.3 Water Quality Based Effluent Limitations

A.3.1 Statutory and Regulatory Basis

18 AAC 70.010 prohibits conduct that causes or contributes to a violation of the WQS. 18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving waterbody. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA).

The CWA requires that the effluent limit for a pollutant be the more stringent of either TBELs or WQBELs. TBELs are established by the Environmental Protection Agency (EPA) for many industries in the form of Effluent Limitation Guidelines (ELGs), are based on available pollution control technology and are adopted by reference in 18 AAC 83. The Department adopts the subject ELGs by reference in 18 AAC 83.010.

A.3.2 Reasonable Potential Analysis

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving waterbody concentration for each pollutant of concern downstream of where the effluent enters the receiving waterbody. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the receiving waterbody concentration. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a WQBEL must be developed.

According to 18 AAC 70.990(38), a mixing zone is an area in a waterbody surrounding, or downstream of, a discharge where the effluent plume is diluted by the receiving water within which specified water quality criteria may be exceeded. Water quality criteria and limits may be exceeded within a mixing zone. A mixing zone can be authorized only when adequate receiving waterbody flow exists, and the concentration of the pollutant of concern in the receiving waterbody is below the numeric criterion necessary to protect the designated uses of the waterbody.

Reasonable Potential Analysis (RPA) calculations were computed for the following parameters known to be present in the Valdez WWTF effluent; ammonia, and copper. Parameters were chosen for RPA through monitoring required by the previous permit, expanded effluent testing or other testing conducted by the permittee. The RPA was conducted in accordance with the Department's *APDES Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (RPA Guide).

A.3.3 Procedure for Deriving Water Quality-Based Effluent Limits

The *Technical Support Document for Water Quality-Based Toxics Control* (TSD) (Environmental Protection Agency (EPA), 1991) and the AWQC recommend the flow conditions for use in calculating WQBELs using steady-state modeling. The TSD, APDES Guide, and the WQS state the WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria. In marine settings, tidal velocities must be representative of critical conditions as well.

The first step in developing a WQBEL is to develop a WLA for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of the WQC or a total maximum daily load (TMDL) in the receiving waterbody. If a mixing zone is authorized in the permit, the WQC apply at all points outside the mixing zone.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow, or for some other reason one is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion. The WQS at 18 AAC 70.020(a) designates classes of water for beneficial uses of water supply, water recreation, and of growth and propagation of fish, shellfish, other aquatic life, and wildlife.

A.3.4 Specific Water Quality-Based Effluent Limits

A.3.4.1 pH

The WQS at 18 AAC 70.020(b)(18)(A)(i) Aquaculture and 18 AAC 70.020(b)(18)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife states that the pH water quality criteria for marine waters may not be less than 6.5 or greater than 8.5 Standard Units (S.U.).

DEC reviewed pH monitoring data for Outfall 002A from August 2015 to July 2020. During this time period the lowest minimum pH value observed was 6.97 S.U. and the highest maximum pH value was 8.24 S.U. The previous permit implemented WQBELs for pH that required a minimum of 6.5 S.U. and a maximum of 8.5 S.U., monitored at a frequency of two times per week. The WQBELs and monitoring frequency requirement is carried forward in the permit.

A.3.4.2 Temperature

The WQS at 18 AAC 70.020(b)(22)(A)(i) Aquaculture and 18 AAC 70.020(b)(22)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife state that temperature may not cause the weekly average temperature to increase more than 1 degrees Centigrade (^{o}C). The maximum rate of change may not exceed 0.5 ^{o}C per hour. Normal daily temperature cycles may not be altered in amplitude or frequency. 18 AAC 70.020(b)(22)(A)(ii) Water Supply seafood processing states that the temperature must not exceed 15 ^{o}C.

DEC reviewed temperature monitoring data for Outfall 002A from August 2015 to July 2020. During this period the temperature ranged from a minimum of 4 ^{o}C to a maximum of 22 ^{o}C. Effluent temperatures exceeded 15 ^{o}C seventeen times. The previous permit required monitoring effluent temperature once per week and report the daily maximum observed temperature each month. Temperature is included because it fits within the authorized mixing zone and previous monitoring results indicated it exceeds or has the potential to exceed WQS at the monitoring point. This monitoring and reporting requirement is carried forward in the permit.

A.3.4.3 Dissolved Oxygen

Aerobic microorganisms require dissolved oxygen (DO) in order to metabolize organic wastes into inorganic byproducts and reproduce. Municipal wastewater exerts a demand on the oxygen resource of waterbodies via BOD_5.

The WQS at 18 AAC 70.020(b)(15)(A)(i) states that DO concentrations for aquaculture, contact recreation, secondary recreation, the harvesting for consumption of raw mollusks or other raw aquatic life, and the growth and propagation of fish, shellfish, other aquatic life, and wildlife, surface DO concentration in

coastal water may not be less than 6.0 milligrams per liter (mg/L) except where natural conditions cause this value to be depressed. In no case may DO levels exceed 17mg/L.

DEC reviewed DO monitoring data for Outfall 002A from August 2015 to July 2020. During this period the DO ranged from a minimum of 3.1 mg/L to a maximum of 16.04 mg/L. Minimum effluent DO values were found to be lower than 6.0 mg/L 22 times. The facility has demonstrated that it cannot consistently meet WQS for subsurface coastal waters, where DO concentrations may not be less than 6.0 mg/L. DEC determined that the facility has the capability to meet the surface DO condition of 18 AAC 70.020(b)(15)(A)(i) where DO may not be reduced below 4 mg/l at any point beneath the surface, so the permit requirement has a new WQBEL for a daily minimum DO concentration of 4.0 mg/L. The previous permit required a DO daily minimum concentration of 2.0 mg/L and daily maximum concentration of 17 mg/L, monitored at a frequency of two times per week. The daily maximum concentration and monitoring frequency requirement are carried forward in the permit.

Since the Valdez WWTF cannot be reasonably expected to meet the WQS at 18 AAC 70.020(b)(15)(A)(i) for subsurface coastal water, a mixing zone is required for DO. DO is included in the chronic mixing zone sized for ammonia.

A.3.4.4 Total Residual Chlorine (TRC)

The Valdez WWTF uses chlorine to disinfect wastewater prior to discharge. The WQS at 18 AAC 70.020(b)(23)(C) defines TRC concentrations for aquatic life for marine water, as the concentration of substances in water may not exceed the numeric criteria for aquatic life for marine water shown in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (2008)* (Toxics Manual), which corresponds to a TRC chronic limit of 0.0075 mg/L, and the acute limit of 0.013 mg/L.

DEC reviewed TRC monitoring data for Outfall 002A from August 2015 to July 2020. During this time period the reported daily maximum TRC values ranged from 0.01 mg/L to .0.04 mg/L and the monthly average TRC values ranged from 0.01 mg/L to 0.02 mg/L. The TRC monitoring performed twice per week by the facility over the previous permitting period confirms that there were no detected TRC effluent results above the method detection limit (MDL)/compliance level of 0.10 mg/L implemented in the permit. Since 0.1 mg/L was the MDL, nonzero results reported below that threshold were estimated values. Considering that the reported values for TRC were estimated and contained some degree of uncertainty, the effluent limits for TRC were carried forward from the previous permit. The facility has been advised to report TRC values above zero and below the MDL as '<0.10 mg/L' on future DMRs. If the facility can demonstrate that they have established a method that meets DEC quality control approval to report estimated values below the 0.1 mg/L as factual numerical values and have established QAPP procedures documenting the method, then estimated TRC values as reported may be evaluated for the next permit reissuance.

The previous permit implemented WQBELs for TRC that required a daily maximum concentration of 0.07 mg/L and a monthly average of 0.03 mg/L, monitored at a frequency of two times per week. The WQBEL and monitoring frequency requirement is carried forward in the permit.

A.3.4.5 Fecal Coliform (FC) Bacteria

Fecal coliform bacteria are a non-pathogenic indicator species whose presence suggests the likelihood that pathogenic bacteria are present.

The WQS at 18 AAC 70.020(b)(14)(D) Harvesting of raw mollusk or other aquatic life criterion states that the fecal coliform (FC) bacteria concentration shall not exceed 14 fecal coliform colonies per 100 milliliters (FC/100 mL) and not more than 10% of samples shall exceed a FC bacteria concentration of 43 FC/100 mL.

DEC reviewed FC bacteria monitoring data for Outfall 002A from August 2015 to July 2020. The results of the daily maximum FC bacteria count ranged from 5.0 FC/100 mL to 271 FC/100 mL. The results of the average monthly FC bacteria count ranged from 2 FC/100 mL to 175 FC/100 mL. The previous permit limits of an average monthly limit (AML) of 200 FC/100 mL, an average weekly limit (AWL) of 400 FC/100 mL, and a daily maximum limit (DML) of 800 FC/100mL were never exceeded.

FC bacteria can be reasonably expected to exceed WQ criteria. A mixing zone is required to meet the WQ criteria of 14 FC/100 mL AML and 43 FC/100 mL MDL.

DEC modeled FC bacteria in the CORMIX mixing zone modeling program and determined that FC fit within the chronic mixing zone sized for ammonia. Based on the facility's consistent ability to produce an effluent capable of meeting the FC bacteria concentration limits required of the vast majority of secondary treatment facilities throughout the state, and compliance with the State's definition of disinfection at 18 AAC 72.990(21(A)(B), the FC bacteria limits and monitoring requirements are carried forward from the previous permit. The selected limits are protective of WQ criteria at the boundary of the mixing zone. Monitoring of FC bacteria concentrations will be assessed for compliance with Alaska WQ criteria at 18 AAC 70.020(b)(14)(D).

A.3.4.6 Enterococci Bacteria

Enterococci bacteria are indicator organisms of harmful pathogens recommended by the EPA to protect primary contact recreation for marine waters.

The EPA Beaches Environmental Assessment and Coastal Health Act (BEACH Act) requires states and territories with coastal recreation waters to adopt enterococci bacteria criteria into their WQS. The WQS at 18 AAC 70.020(b)(14)(B) for contact recreation specifies that the enterococci bacteria monthly geomean concentration shall not exceed 35 enterococci colony forming units per 100 milliliters (cfu/100 mL) and not more than 10% of the samples may exceed a concentration of 130 enterococci cfu/100mL. Contact recreation is defined as activities in which there is direct and intimate contact with water. These activities would only take place during the summer season, May 1 to September 30.

DEC reviewed enterococci bacteria monitoring data for Outfall 002A from August 2015 to July 2020. The daily maximum enterococci results ranged from 1.0 cfu/100 mL to 219 cfu/100 mL. The 130 cfu/100 mL criterion at 18 AAC 70.020(b)(14)(B) for contact recreation of was exceeded one time. DEC determined that the disinfection measures employed by the Valdez WWTF for FC bacteria are insufficient for the facility to meet FC WQS at the end of the pipe. Since the previous permit required Valdez WWTF to collect enterococci bacteria data only two times per year, there are too few data points to conduct a full RPA for enterococci bacteria. DEC determined that since disinfection measures would affect FC and enterococci bacteria in a similar manner, it is reasonable to conclude that disinfection would not be sufficient for enterococci bacteria concentrations.

Enterococci bacteria can be reasonably expected to exceed WQ criteria at the end of the pipe. DEC determined that enterococci bacteria fit within the mixing zone sized for ammonia in order to meet the WQ criteria of 130 cfu/100 mL daily maximum limit and 35 cfu/100 mL monthly geomean concentration of 18 AAC 70.020(b)(14)(B) for contact recreation. The monitoring frequency is increased from twice per year to monthly reporting during the summer season. The summer season is May 1 – September 30, determined to be when the receiving water would most likely be used for contact recreation. Enterococci bacteria

monitoring is required to be performed at the same time as FC bacteria monitoring and shall be collected on the same day.

A.3.4.7 Total Ammonia (as Nitrogen)

Total ammonia is the sum of ionized (NH4+) and un-ionized ammonia (NH3). Temperature, pH, and salinity affect which form, NH4+ or NH3 is present. NH3 is more toxic to aquatic organisms than NH4+ and predominates with higher temperature and pH. Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however, without advanced treatment, wastewater effluent may still contain elevated levels of ammonia as nitrogen. Excess ammonia as nitrogen in the environment can lead to dissolved oxygen depletion, eutrophication, and toxicity to aquatic organisms.

In the previous APDES permit, ammonia was the parameter that required the greatest dilution to meet WQ criteria at the boundary of the acute and chronic mixing zones and the permit conditions required the City to monitor ammonia in the effluent. Salinity, pH and temperature are physical properties used to determine ammonia water quality criteria; required as inputs to mixing zone modeling programs such as CORMIX, in addition to the inputs for effluent ammonia concentrations. In the previous permit, the ammonia WQS numeric criteria were determined using the RPA Guide for marine waters at 20 grams per kilogram (g/kg) salinity, temperature of 10° C, and a pH of 8.0 SU. The acute aquatic life ammonia criterion of 11.5 mg/L and the chronic aquatic life ammonia criterion of 1.7 mg/L were not based on ambient water monitoring in Port Valdez. The City of Valdez (City) collected receiving water ammonia data from Port Valdez between 2015 and 2019, and DEC used salinity and 85th percentile of the pH and temperature receiving water monitoring data to derive ammonia criteria from tables in Appendix F and G the Toxics Manual, consistent with the Department's RPA Guide. An acute ammonia WQS numeric criterion of 17.3 mg/L and a chronic criterion of 2.6 mg/L were used for the RPA calculation of the critical ambient concentration (Cs) of 0.390 mg/L. For more information on receiving water monitoring used in the permit, see Fact Sheet Part 3.5.1.

The City also collected effluent monitoring data for Outfall 002A from August 2015 to July 2020. The results ranged from 3.0 mg/L to 20 mg/L. This data was also used in the *Reasonable Potential Analysis and Water Quality-Based Effluent Limits Calculation Tool* (RPA Tool) to determine that ammonia has RP to exceed WQS at the end of the pipe. The ammonia effluent data was incorporated into the CORMIX models. The CORMIX mixing zone modeling program was used to determine that ammonia was the parameter that required the most dilution to meet WQS and was, therefore, the driver of the size of the chronic mixing zone. Since the current permit includes different data than that used to model mixing zone sizes in the previous permit, the mixing zone size for the current permit changed from the previous mixing zone size. The chronic mixing zone size in the current permit is reduced from the previous permit. The previous permit chronic mixing zone dimensions were 66 feet (ft) in length x 44 ft in width, totaling 2,904 square ft (ft ^{2}) and the current permit chronic mixing zone length is 87 ft in length x 17 ft in width, totaling 1,479 ft ^{2}. More information about mixing zone sizes can be found in Fact Sheet Part 4.5.1.

All other parameters fit within the mixing zone sized for ammonia. The permit implements new WQBELs for ammonia in the permit at Outfall 002A with a DML of 41 mg/L and an AML of 23 mg/L. More information about calculations for ammonia effluent limits in the permit can be found in Fact Sheet Appendix B. The selected limits are protective of WQ criteria at the boundary of the mixing zone. The monitoring frequency of monthly reporting is carried forward from the previous permit.

A.3.4.8 Copper

The WQS at 18 AAC 70.020(b)(23)(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife state that the concentration of substances in water may not exceed the numeric criteria for aquatic

life for marine water and human health for consumption of aquatic organisms only shown in the Toxics Manual, or any chronic and acute criteria established in this chapter, for a toxic pollutant of concern, to protect sensitive and biologically important life stages of resident species of this state. No ambient water monitoring for copper was required in the previous permit. In accordance with the RPA Guide, DEC determined Cs for copper to be 0.560 micrograms per liter (μg/L). This value is 15% of the most stringent copper WQS numeric criterion, 3.7 μg/L, the chronic aquatic life criterion.

Copper was identified as a pollutant of concern in the previous permit and quarterly monitoring requirements were included for Outfall 002A. DEC reviewed copper monitoring data for Outfall 002A from August 2015 to July 2020. The results ranged from 3.25 μg/L to 9.56 μg/L and the number of monitoring results was sufficient to conduct an RPA for copper. DEC determined that there is RP for copper to exceed water quality criteria at the end of the pipe and that copper was a parameter to be included in the mixing zone.

The CORMIX mixing zone modeling program was used to determine that copper was the parameter that required the most dilution to meet WQS at the boundary of the acute mixing zone and is the driver of the size of the acute mixing zone. More information about the size of the acute mixing zone can be found in Fact Sheet Part 4.5.1 and calculations for copper effluent limits in the permit can be found in Fact Sheet Appendix B.

The permit implements WQBELs for copper at Outfall 002A with a DML of 13 μg/L and an AML of 9 μg/L. The monitoring frequency is increased to monthly reporting. This is a new WQBEL in the permit and the selected limits are protective of WQ criteria at the boundary of the mixing zone.

A.3.4.9 Residues: Floating solids, debris, sludge, deposits, foam, scum, or other residues.

The Alaska WQS (2003) for residues are narrative. The most stringent standard for marine water, found at 18 AAC 70.020(b)(20)(C), "May not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use, or cause acute or chronic problem levels as determined by bioassay or other appropriate methods. May not, alone or in combination with other substances, cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines." This narrative standard is carried forward from the previous permit.

A.4 Selection of the Most Stringent Limitations

Table A-2 provides a summary and reference for parameters that have effluent limits at Outfall 002A at Valdez WWTF.

Table A- 2: Summary of Effluent Limits

Parameter	Fact Sheet Reference	Type of Effluent Limit
BOD_5	Fact Sheet Part 3.3 Appendix A.1	TBEL (including minimum percentage removal) implemented at end of pipe
TSS		
pH	Fact Sheet Part 3.3 Appendix A.3.4.1	TBEL implemented at end of pipe
Temperature	Fact Sheet Part 3.3 Appendix A.3.4.2	WQBEL equal to 18 AAC 70 WQS implemented at boundary of chronic mixing zone
Dissolved Oxygen	Fact Sheet Part 3.3 Appendix A.3.4.3	WQBEL equal to 18 AAC 70 WQS implemented at boundary of chronic mixing zone
Total Residual Chlorine	Fact Sheet Part 3.3 Appendix A.3.4.4	WQBEL equal to 18 AAC 70 WQS implemented at boundary of chronic mixing zone
Fecal Coliform Bacteria	Fact Sheet Part 3.3 Appendix A.3.4.5	WQBEL equal to 18 AAC 70 WQS implemented at boundary of chronic mixing zone
Enterococci Bacteria	Fact Sheet Part 3.3 Appendix A.3.4.6	WQBEL equal to 18 AAC 70 WQS implemented at boundary of chronic mixing zone
Total Ammonia, as Nitrogen	Fact Sheet Part 3.3 Fact Sheet Part 4.5 Appendix A.3.4.7	WQBEL equal to 18 AAC 70 WQS implemented at end of pipe, dilution from mixing zone applied to meet WQS at boundary of chronic mixing zone.
Copper (total recoverable)	Fact Sheet Part 3.3 Fact Sheet Part 4.5 Appendix A.3.4.8	WQBEL equal to 18 AAC 70 WQS implemented at end of pipe, dilution from mixing zone applied to meet WQS at boundary of chronic mixing zone.

APPENDIX B- REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to determine the reasonable potential for any pollutant to exceed a water quality numeric criterion.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving waterbody concentration exceeds water quality criteria, and a water quality-based effluent limit (WQBEL) must be included in the permit (18 Alaska Administrative Code 83.435).

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge. For criteria that are expressed as maxima, the 85th percentile of the ambient data is generally used as an estimate of the worst case. If ambient data is not available, DEC uses 15% of the most stringent given pollutant's criteria as a worst-case example. Ammonia is used as an example to demonstrate the reasonable potential determination process.

B.1 Mass Balance

For a discharge to a flowing waterbody, the maximum projected receiving waterbody concentration is determined using a steady state model represented by the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation B-1)}$$

Where,

C_d = Receiving waterbody concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = Assumed receiving waterbody ambient concentration

Q_d = Receiving waterbody flow rate = $Q_e + Q_u$

Q_e = Effluent flow rate (set equal to the design flow of the wastewater treatment facility (WWTF)

Q_u = Receiving waterbody flow rate

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation B-2)}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u (Q_U \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation B-3)}$$

Where, MZ = the fraction of the receiving waterbody flow available for dilution.

Where mixing is rapid and complete, MZ is equal to 1 and equation C-2 is equal to equation C-3 (i.e., all of the critical low flow volume is available for mixing). If a mixing zone is not authorized, dilution is not considered when projecting the receiving waterbody concentration, and

$$C_d = C_e \qquad \text{(Equation B-4)}$$

In other words, if a mixing zone is not authorized, the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQS numeric criteria, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.
Equation C-2 can be simplified by introducing a dilution factor (D):

$$D = \frac{Q_e + Q_u}{Q_e} \qquad \text{(Equation B-5)}$$

After the D simplification, this becomes:

$$C_d = \frac{(C_e - C_u)}{D} + c_u \qquad \text{(Equation B-6)}$$

B.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in section 3.3 of the TSD, "*Determining the Need for Permit Limits with Effluent Monitoring Data*" and the process described in section 2.4 of DEC's RPA Guide. In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.
Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD and DEC's RPA Guide recommends making the assumption that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability.
In the example of ammonia, the Department used ProUCL, a statistical software program, to determine a CV of 0.4645 for ammonia. ProUCL indicated that the data set follows a lognormal statistical distribution. Therefore, the RPM equation in section 2.4.2.1 of the RPA Guide is used to determine the RPM for ammonia.

$$RPM = \frac{\mu_n + z_{99}\,\sigma}{\mu_n + p_n\,\sigma} \qquad \text{(Equation B-7)}$$

Where,
z_{99} = the z − statistic at the 99th percentile = 2.326
μ_n = mean calculated by ProUCL = 1.851
σ = the standard deviation calculated by ProUCL = 0.442
p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 0.947$
n = number of valid data samples = 60
RPM = 1.3
The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

$$\text{MEC} = (\text{RPM})(\text{MOC}) \qquad \text{(Equation B-8)}$$

In the case of ammonia,
MOC = 20 milligrams per liter (mg/L)
MEC = (1.3)(20) = 26.87 mg/L

In the example of copper, the Department used ProUCL to determine a CV of 0.2697. ProUCL indicated that the data set follows a lognormal statistical distribution.

$$RPM = \frac{\mu_n + z_{99}\,\sigma}{\mu_n + p_n\,\sigma} \qquad \text{(Equation B-7)}$$

Where,
z_{99} = the z − statistic at the 99th percentile = 2.326
μ_n = mean calculated by ProUCL = 1.684
σ = the standard deviation calculated by ProUCL = 0.265
p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 0.854$
n = number of valid data samples = 19
RPM = 1.4
The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

$$\text{MEC} = (\text{RPM})(\text{MOC}) \qquad \text{(Equation B-8)}$$

In the case of copper,
MOC = 9.56 micrograms per liter (μg/L)
MEC = (1.4)(9.6) = 13.39 μg/L

Comparison with ammonia water quality criteria

In order to determine if RP exists for this discharge to exceed water quality criteria, the highest projected concentration is compared with the most stringent water quality criteria.

MEC = 26.87 mg/L > 2.6 mg/L (most stringent ammonia criterion)

YES, there is RP for ammonia to violate water quality criteria

Since there is RP for the effluent to cause an exceedance of water quality criteria for protection of aquatic life, and because ammonia is the parameter requiring the most dilution of pollutants that demonstrate reasonable potential to exceed water quality criteria, a WQBEL for ammonia is required. See Appendix C for that calculation.

Comparison with copper water quality criteria

In order to determine if RP exists for this discharge to exceed water quality criteria, the highest projected concentration is compared with the most stringent water quality criteria.

MEC = 13.39 μg/L > 5.8 μg/L (most stringent copper criterion; the acute aquatic life criterion)

YES, there is RP for ammonia to violate water quality criteria

Since there is RP for the effluent to cause an exceedance of water quality criteria for protection of aquatic life, and because copper is the parameter requiring the most dilution of pollutants that demonstrate reasonable potential to exceed the acute aquatic life water quality criterion, a WQBEL for copper is required. See Appendix C for that calculation.

Table B-1 summarizes the data, multipliers, and criteria used to determine reasonable potential to exceed water quality criteria. For each parameter, the MEC equals the maximum observed effluent concentration times the RPM producing a number based on wastewater treatment facility performance, which was used to determine if there is a reasonable potential for the effluent to exceed WQS.

Table B- 1: Reasonable Potential Determination at the End of Pipe

Parameter	Max Observed Effluent Conc.	Number of Samples	Coefficient of Variation (CV)	Reasonable Potential Multiplier (RPM)	Max Expected Effluent Conc. (MEC)[a]	Most Stringent Water Quality Criterion	Reasonable Potential (yes or no)
Ammonia as Nitrogen (mg/L)	20	60	0.4645	1.3	26.87	2.6	yes
Copper, total recoverable (µg/L)	9.56	19	0.2697	1.4	13.39	5.8	yes
Chlorine, total residual (µg/L)	40	60	0.3883	1.2	46.32	7.5	yes

APPENDIX C- SELECTION OF EFFLUENT LIMITS

If the Alaska Department of Environmental Conservation (the Department or DEC) does not authorize a mixing zone, water quality standards (WQS) numeric criteria are applied at the end of the pipe, and technology-based effluent limits (TBELs) are selected for those parameters that are solely technology based.

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet WQS numeric criteria. If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQS numeric criteria for that parameter, apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water-quality based effluent limits (WQBELs) for specific parameters in order to protect human health criteria at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone, must meet applicable water quality numeric criteria at the end of pipe. In the absence of water quality criteria for a particular pollutant, such as for 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS), TBELs are applied as end-of pipe effluent limits.

In the case of the Valdez Wastewater Treatment Facility (WWTF, or the facility), ammonia demonstrated reasonable potential to exceed at the end of pipe and required the most dilution to meet water quality criteria at the boundary of the authorized chronic mixing zone. Copper demonstrated reasonable potential to exceed at the end of pipe and required the most dilution to meet water quality criteria at the boundary of the authorized acute mixing zone; therefore, the Department developed WQBELs for ammonia and copper.

C.1 Effluent Limit Calculation

Once the Department determines that the effluent has a reasonable potential to exceed a WQS, a WQBEL for the pollutant is developed. The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System RPA and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to calculate WQBELs for ammonia. The first step in calculating WQBELs is the development of a wasteload allocation (WLA) for the pollutant.

C.2 Mixing Zone-based WLA

When the Department authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations of the pollutant, and the WQS. For the aquatic life chronic monthly limit, the WLA is applied directly as an average monthly limit (AML). The daily maximum limit (DML) is then calculated from the AML by applying a multiplier.

C.3 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the criteria or because the Department does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. When a chronic aquatic life criterion applies to a pollutant, the chronic dilution factor is used to calculate a WLA.

C.4 Permit Limit Derivation

The Department applies the statistical approach described in Chapter 5 of the TSD to calculate the daily maximum limit (DML) and average monthly limit (AML). This approach takes into account effluent variability (using the coefficient of variation (CV)) and sampling frequency.

The DML is based on the CV of the data and the probability basis, while the AML is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95% for the AML calculation and 99% for the DML calculation.

The following is a summary of the steps to derive WQBELs from WQS numeric criteria for pollutants that have reasonable potential to exceed water quality numeric criteria. These steps are found in the RPA Guide and the guidance's accompanying Microsoft Excel RPA Tool. The guidance and tool were used to calculate the DMLs and AMLs for ammonia and copper in the Valdez WWTF permit. Ammonia and copper are illustrated below as examples.

Step 1- Determine the WLA

The first step in developing a WQBEL is to develop a wasteload allocation (WLA) for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality criteria or a total maximum daily load in the receiving waterbody.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The acute and chronic aquatic life criteria are converted to WLAs using the following equation:

$$WLA_{a,c,hh} = \left(WQC_{a,c,hh}\right)\left(D_{a,c,hh}\right) + C_s\left(1 - D_{a,c,hh}\right)$$

$$WLA_{a,c,hh} = WQC_{a,c,hh}\left(\frac{Q_d + Q_s}{Q_d}\right) + C_s\left(1 - \left[\frac{Q_d + Q_s}{Q_d}\right]\right)$$

Where: $D_{a,c} = Dilution = \frac{(Q_d + Q_s)}{Q_d}$

$D_{hh} = (Dilution\ [Human\ Health]) = D_c\ (Dilution[Chronic\ Aquatic\ Life])$

$Q_d = Critical\ Discharge\ Flow$

$C_s = Critical\ Upstream\ Concentration$

$WLA_{a,c} = Wasteload\ Allocation\ (\ acute, ammonia)$

$WQC_{a,c} = \ C_r\ = Water\ Quality\ Criterion(acute, chronic)$

For ammonia,

$D_a\ = not\ applicable$

$D_c\ = 11.9$

$C_s = 0.390\ milligrams\ per\ liter\ \ (mg/L)$

$WLA\ \ = \ 40.97\ mg/L$

$WQC\ \ = 2.6\ mg/L$

For copper,

$D_a\ = 2.4$

$D_c\ = not\ applicable$

$C_s = 0.56\ micrograms\ per\ liter\ \ (\mu g/L)$

$WLA = 13.10\ \mu g/L$

$WQA = 5.8\ \mu g/L$

Step 2 - Determine the Long-Term Average (LTA)

The WLAs are converted to LTAs using multipliers that are derived from equations in section 5.4 of the TSD:

$$LTA_a = WLA_a * exp(0.5\sigma^2 - z_{99}\sigma)$$

$$LTA_c = WLA_c * exp(0.5\sigma_4^2 - z_{99}\sigma_4)$$

Where:

$z_{99} = the\ z-statistic\ at\ the\ 99^{th} percentile = 2.326$

$LTA_a\ only$: $\sigma = ln[CV^2 + 1]^{1/2}$

$LTA_a\ only$: $\sigma^2 = ln[CV^2 + 1]$

$LTA_c\ only$: $\sigma_4 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]^{1/2}$

$LTA_c\ only$: $\sigma_4^2 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]$

$CV = coefficient\ of variation$

For ammonia:

$LTA_a = not\ applicable$

$LTA_c = 16.08\ mg/L$

For copper:

$LTA_a = 7.32\ \mu g/L$

$LTA_c = not\ applicable$

Step 3 – Choosing the More Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the two LTAs is used to derive the effluent limits. In the case of ammonia, the LTA_c is more limiting. In the case of copper, the LTA_a is more limiting.

Step 4 - Calculate the Permit Limits

The DML and AML are calculated using the following equations that are found in Table 5-2 of the TSD:

$$DML_{aquatic\ life} = LTA * exp(z_{99}\sigma - 0.5\sigma^2)$$

Where:

$z_{99} = the\ z-statistic\ at\ the\ 99^{th} percentile = 2.326$

$\sigma_n = ln[CV^2 + 1]^{1/2}$

$\sigma_n^2 = ln[CV^2 + 1]$

$CV = coefficient\ of variation$

$$AML_{aquatic\ life} = LTA * exp(z_{95}\sigma_n - 0.5\sigma_n^2)$$

Where:

$z_{95} = the\ z - statistic\ at\ the\ 95^{th} percentile = 1.645$

$$\sigma_n = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]^{1/2}$$

$$\sigma_n^2 = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]$$

$CV = coefficient\ of variation$

$n = number\ of\ samples\ per\ month$

For ammonia:

$DML = 41\ mg/L$

$AML = 23\ mg/L$

For copper:

$DML = 13\ \mu g/L$

$AML = 9\ \mu g/L$

APPENDIX D- MIXING ZONE ANALYSIS CHECKLIST

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 are satisfied, as well as provide justification to authorize a mixing zone in an Alaska Pollutant Discharge Elimination System permit. See Fact Sheet Section 4.5 for the Valdez Wastewater Treatment Facility mixing zone analysis.

	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable? **Yes** **If yes, mixing zone may be approved as proposed or authorized with conditions.**	Technical Support Document for Water Quality-Based Toxics Control DEC's Reasonable Potential Analysis Guidance Environmental Protection Agency's Permit Writers' Manual CORMIX 11.0	**18 AAC 70.240(k)**
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants? **Yes** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(1)**
Low Flow Design	**For streams, rivers or other flowing fresh waters.** - Determine low flow calculations or documentation for the applicable parameters.	N/A	**18 AAC 70.240(l))**
Existing Uses	Does the mixing zone… (1) maintain and protect designated and existing uses of the waterbody as a whole? **Yes** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(2)**
	(2) impair overall biological integrity of the waterbody? **No**		**18 AAC 70.240(c)(3)**

	Description	Resources	Regulation
	If yes, mixing zone may be approved as proposed or authorized with conditions.		
	(3) create a public health hazard that would preclude or limit existing uses of the waterbody for water supply or contact recreation? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(B)**
	(4) preclude or limit established processing activities or established commercial, sport, personal use, or subsistence fish and shellfish harvesting? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(C)**
Human Consumption	Does the mixing zone… (1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? **No** **If yes, mixing zone may not be approved.**		**18 AAC 70.240(d)(6)**
Spawning Areas	Does the mixing zone… (1) discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, chinook, and sockeye salmon? **No** **If yes, mixing zone may not be approved.**		**18 AAC 70.240(f)**
Human Health	Does the mixing zone… (1) contain bioaccumulating, bioconcentrating, or persistent chemicals above natural levels to significantly adverse levels? **No** **If yes, mixing zone may not be approved.**		**18 AAC 70.240(d)(1)**

	Description	Resources	Regulation
	2) contain chemicals expected to present a unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by the Department? **No** **If yes, mixing zone may not be approved.**		**18 AAC 70.240(d)(2)**
	(3) occur in a location where the department determines that a public health hazard reasonably could be expected? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(k)(4)**
Aquatic Life	Does the mixing zone… (1) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(A)**
	(2) result in a reduction in fish or shellfish population levels? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(D)**
	(3) result in permanent or irreparable displacement of indigenous organisms? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions**		**18 AC 70.240(c)(4)(E)**
	(4) form a barrier to migratory species or fish passage? **No** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(G)**
	(5) result in undesirable or nuisance aquatic life? **No** **If yes, mixing zone may not be approved.**		**18 AAC 70.240(d)(5)**
	(6) prevent lethality to passing organisms; or exceed acute aquatic life criteria at and beyond the boundaries of a smaller initial mixing zone surrounding the outfall, the size of which shall be determined using methods approved by the Department? **Yes**		**18 AAC 70.240(d)(7)** **18 AAC 70.240(d)(8)**

	Description	Resources	Regulation
	If no, mixing zone may not be approved.		
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone? If yes, are there likely to be adverse effects to T/E spp based on comments received from the United States Fish and Wildlife Service or National Oceanic and Atmospheric Association? If yes, will conservation measures be included in the permit to avoid adverse effects? **Stellar Sea Lion Western Distinct Population Segment (DPS), and the Humpback Whale Mexico DPS could be in the vicinity. Services provided Draft Permit and Fact Sheet** **If yes, mixing zone may be approved as proposed or authorized with conditions.**		**18 AAC 70.240(c)(4)(F)**